

THE AUTOMOBILE

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No. 11

NEARLY READY FOR AMERICAN ELIMINATION

Fifteen Stars and Stripes Candidates Will Be Located Around the Long Island Course by the Week's End

GARDEN CITY, L. I., Sept. 13.—Across this sea-washed elongated island there is a wave of automobilism that seems to cast its spray over everyone. There is one subject that interests all persons, though it must be admitted that the coming of the high-speed contingent raises objection in some quarters. Two

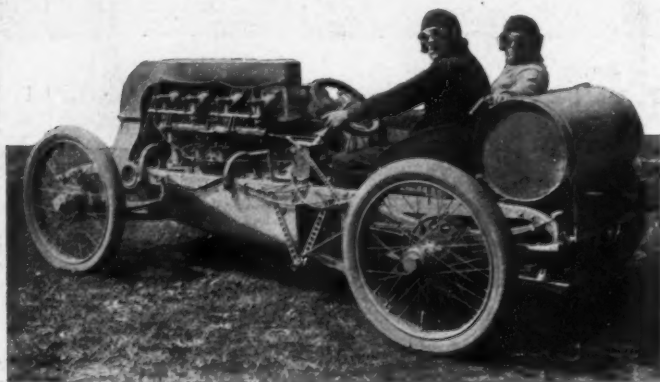
years ago the first race was a novelty that attracted mainly those more or less involved in automobiling directly; last year the general public came in substantial numbers; this year the thousands of the previous race will be multiplied many times. All indications point to the greatest automobile contest ever seen in



THE PICTURESQUE JERICHO TURN BEING MADE AT LEISURELY SPEED BY THE THREE FRAYER-MILLER RACERS.

this country, and it will rank in importance with the principal events abroad. While October 6 is the international date, there is the keenest concern in reference to the five American cars that will triumph on Saturday, September 22, and thus gain the distinction of representing the Stars and Stripes in the tussle with the foreigners, who, appreciating the worth of the American market, are leaving nothing undone that will increase their chances of winning the Vanderbilt Cup.

Fifteen American cars entered for the Elimination Trial, and none will be missing at the starting line, but one or two may betray the evidence of too hurried preparation for such a trying struggle.



A SIDE VIEW OF LEE FRAYER'S AIR-COOLED RACER.

The three Thomas racers, two of which will be driven by Caillois and Le Blon from France, will reach the course some time Saturday. Much is expected of this trio, for in their construction there has been considerable international consultation. Mr. Thomas openly states that he believes in adapting the best ideas, no matter from what source he may obtain them.

The Frayer-Miller cars were among the early arrivals, and Frayer, Belden, and Lawwell are conscientiously studying the course and also becoming thoroughly acquainted with their air-cooled distance annihilators.

Joe Tracy has been trying out one of his Locomobiles, and he expects the other car to be ready in the next day or two. Mechanical experts who have examined the Locomobile consider that its probabilities are second to none, and this view is strengthened by Tracy's third place in last year's race.

Herbert Lytle drove his Pope-Toledo to the course from New York City on Monday, and the same afternoon John Haynes appeared on the scene with his Haynes candidate. The next day Ernest Keeler and his Oldsmobile was numbered among those present. The Oldsmobile will be equipped with removable rims, designed by Keeler, which have proven a decided success. On a test Keeler and Miller made a replacement in thirty seconds. The design of the rim differs materially from any yet invented. The felly is of aluminum, the rest of the wheel being of standard pattern, with wooden spokes and metal hubs. A slot is provided between each spoke, so that the new rim to which a fresh tire has already been attached may be easily slipped on and twisted into place. Two dowel pins held in place by springs have been added to secure the stay bolts of the rim when it is desired to reverse the car.

Ralph Mongini considered his Matheson racer rugged enough to drive from the factory in Wilkesbarre, and he made the run from the Pennsylvania city to the course by easy stages.

Walter Christie, surcharged with confidence, expects to make his first round of the course in the Thursday morning practice hours, at which time the Maxwell racers are also due to participate. The Apperson will probably reach the course on Friday, but the B-L-M may not be seen until early next week.

All around the course preparations are being made, including repairs to the road and the sprinkling of oil, the latter work being carried on under the directions of Nassau County Supervisors.

The "hairpin" turn at Old Westbury is being modified, and several other similar places are receiving attention.

The grandstand has been located on exactly the same place where was built the stand for the first race. The location is on the Jericho Turnpike just beyond the road leading from Westbury station past the old Friends' meeting house. The stand will contain 250 boxes to seat five persons each, and there will also be 1,000 single seats. A band will enliven proceedings at both races. Opposite will be the official and press stand, which also will be larger than that of a year ago. On both sides of the road there will be a strong wire netting that will effectually prevent anyone except the officials from crowding on the course. Sheriff Gildersleeve will take personal charge of the policing at the grandstand, and guarantees that the work will be done effectively. Just below the stand the Vanderbilt Cup Commission will have headquarters in a house leased for the sake of its convenience.

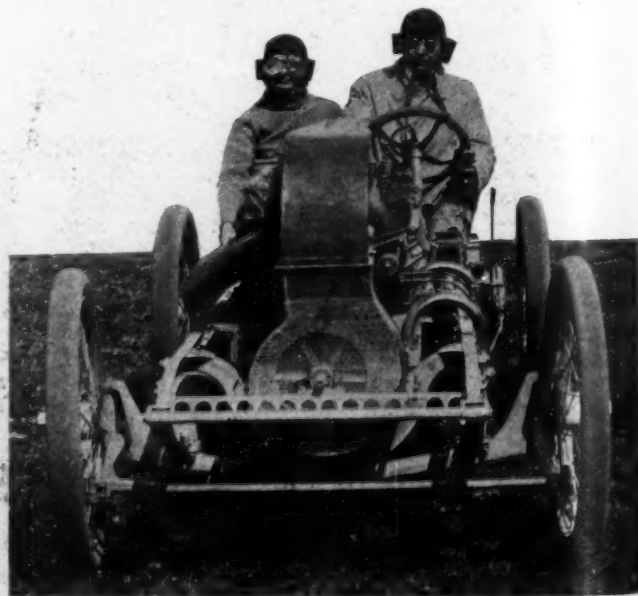
At its session on Monday the Cup Commission decided to hold the drawing for the order of start in the American trial on Saturday evening at 9 o'clock at the Garden City Hotel. Since the official measurement is 29.71 miles, and both the Elimination and the Cup race will be ten circuits, the distance will be 297.1 miles for both events.

The policing of this year's events will be exceptionally well done, and more special officers will be employed than a year ago. The motor cycle control will be increased, and Chairman Thompson intends to see that the public is protected as much as possible in spite of those who may insist upon getting into danger's way.

Mr. Vanderbilt will referee the race, as usual, and ex-Chairmen Pardington and Morrell will be his associates.

TWO UNFORTUNATE ACCIDENTS AT MINEOLA.

MINEOLA, L. I., Sept. 10.—There were two unfortunate happenings to-day, connected with the forthcoming races. Henry Dolbeau, becoming acquainted with the course in a 60-horse-power Mercedes, smashed into a telephone pole on the Jericho road. A new garage being erected by Robert Graves at Mineola collapsed, and several were killed and injured.



A FRONT VIEW WITH "TRANSMISSION BELDEN" AT THE WHEEL.

Dolbeau's accident happened at about 6 o'clock, near Hick's Nursery, opposite Westbury. The car, traveling at a too high rate of speed, struck the foot thick telephone pole and broke it off ten feet from the ground. Apparently the rear wheel caught, for the imprint of the nail studded tire is in the post and the same wheel bounded back over fifty



HOW THE JERICHO TURNPIKE EXTENDS EASTERLY FROM THE GRANDSTAND—COMMISSION HAS RENTED THIS HOUSE.

yards. The car was torn to pieces and bounded over and over for forty yards, landing reversed to the direction it had been traveling at sixty-five miles an hour. The driver landed fifty yards away, or ten yards farther than the car. The mechanic, a man from the B-L-M factory, landed on the opposite side of the road. Neither Dolbeau nor the mechanic was hurt at all, but the recollection of both is hazy. They were practically knocked out for a time. Joe Tracy, with the Locomobile racer, came immediately from Lakeville, and Dolbeau and his mechanic were hurried to Lakeville. In their absence someone dropped a match near the wreck and it caught fire and burned. It is hardly probable that anything will be saved from the wreck.

The mechanic, whose name could not be learned, said that the accident was in no way due to the driver. He remembers seeing Dolbeau vainly striving to get the steering wheel

around. This car was an old one, and was being used for a practice car. That the steering arrangement was off was shown on Saturday morning, when Dolbeau could not pull the car around Krug's Corner, and came near running into the harness shop.

The second accident occurred less than four hours later, when the new \$50,000 garage of Robert Graves fell in, killing several and seriously injuring five. Mr. Graves has been constructing for a long time a concrete garage, two stories, and provided with an elevator. The construction was being rushed to get ready for Jenatzky, who was to arrive in a week. Work was done on Sunday, and every possible man was put to work to-day. The construction was of concrete, which proved to be mud, and the removal of the moulding frames brought the crash. No more complete wreck was ever seen than this intended home for the automobile.

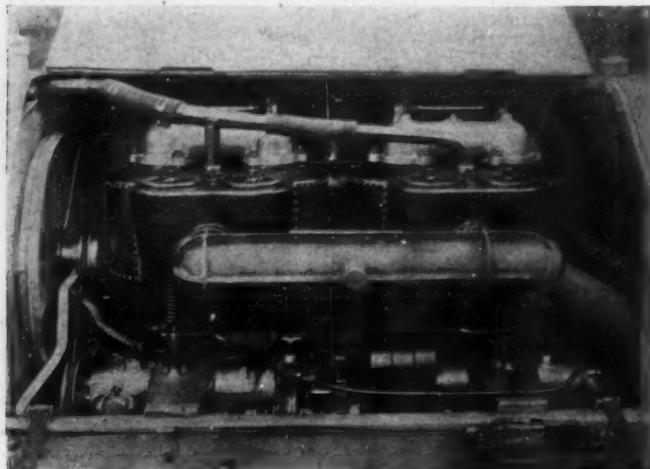


GRANDSTAND COMMITTEE. CHAIRMAN THOMPSON, AT WHEEL, F. G. WEBB AND A. R. PARDINGTON, WITH BUILDER McCORD ON VIEW.

DRIVERS OF FOREIGN CARS ARE ARRIVING.

Elliott F. Shepard was an early one of the drivers who will pilot foreign cars in the October 6 race, reaching this country on Saturday last. His two Hotchkiss racers came on a later steamer.

George Heath, the American who drives a Panhard, was the next to appear, his landing taking place on Tuesday. His car is to follow on *La Savoie*. He has located at Mineola.



VALVE SIDE OF THE LOCOMOBILE RACING MOTOR.

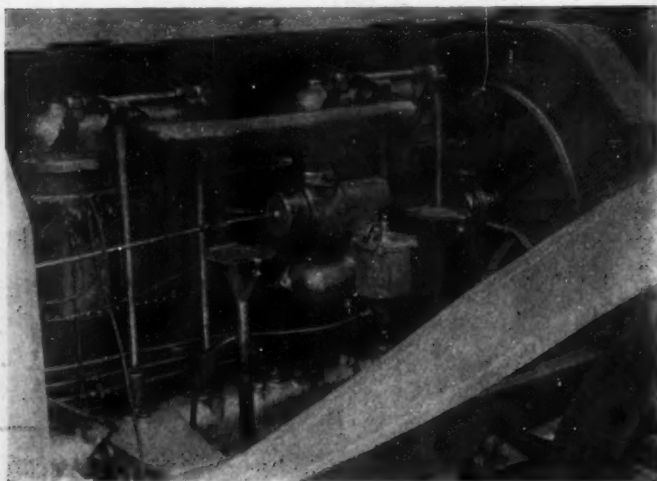
Showing the big exhaust pipe, the magneto and the circulating pump driven by the single camshaft.

Foxhall Keene, the third American who will drive a foreign automobile in the race, has been home for over a fortnight.

It is understood that the entry of C. L. Charley may be transferred in the event of the sale of a racing Mercedes which was recently brought to this country.

THE PREDICTION OF GUSTAVE CAILLOIS.

One of the most interesting predictions made regarding the Elimination Trial, is that of Gustave Caillois, the French driver of one of the Thomas cars.



RIGHT HAND SIDE OF LOCOMOBILE 90-HORSEPOWER MOTOR.

Carburetor is placed on the right-hand side and the fuel pipes extend across the cylinder heads. Note the riveted-on copper water jackets.

"The car that averages sixty miles an hour," Caillois says, "will finish either first or second. In all, there are eleven turns. At every one of these it will be necessary to slow down. Time will be lost not only in approaching the curves, but in accelerating the speed afterward, since no matter how powerful a car may be, time is lost in regaining the maximum."

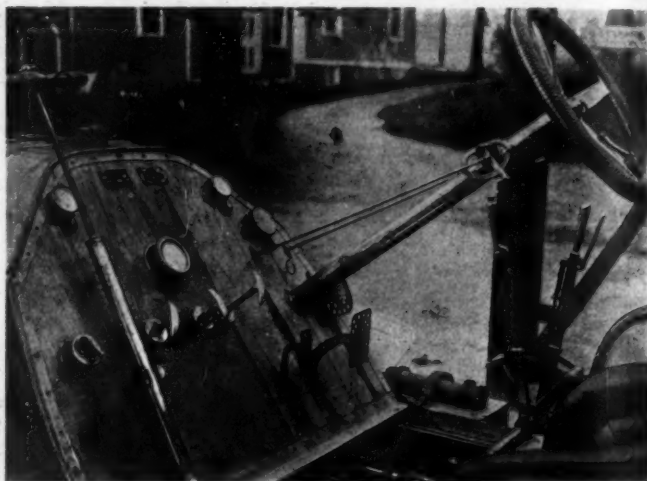
BUFFALO CLUB TO TRAVEL IN SPECIAL.

BUFFALO, Sept. 10.—Arrangements are being made by Secretary Dai H. Lewis, of the Automobile Club of Buffalo, for special Pullman cars to take the Buffalo autoists to see the Vanderbilt race. The Buffalo party will leave on the evening of Thursday, October 4, arriving in New York Friday morning. During the day the special cars in which they travel will be floated around the river and placed on the Long Island Railroad, taking the party late Friday evening to Long Island City, where they will get up Saturday morning within five minutes' walk of the course over which the race will be run.

The Automobile Club of Pittsburg has invited the local club members to meet with them for a good time at Cambridge Springs next Saturday, September 15. The Pittsburg organization has arranged a pleasure run to the Springs and elaborate arrangements have been made for the special entertainment of the members. A number of local autoists have expressed their intention of going on the run into Pennsylvania.

MR. MANN BRINGS OVER THE "SIX" HOTCHKISS.

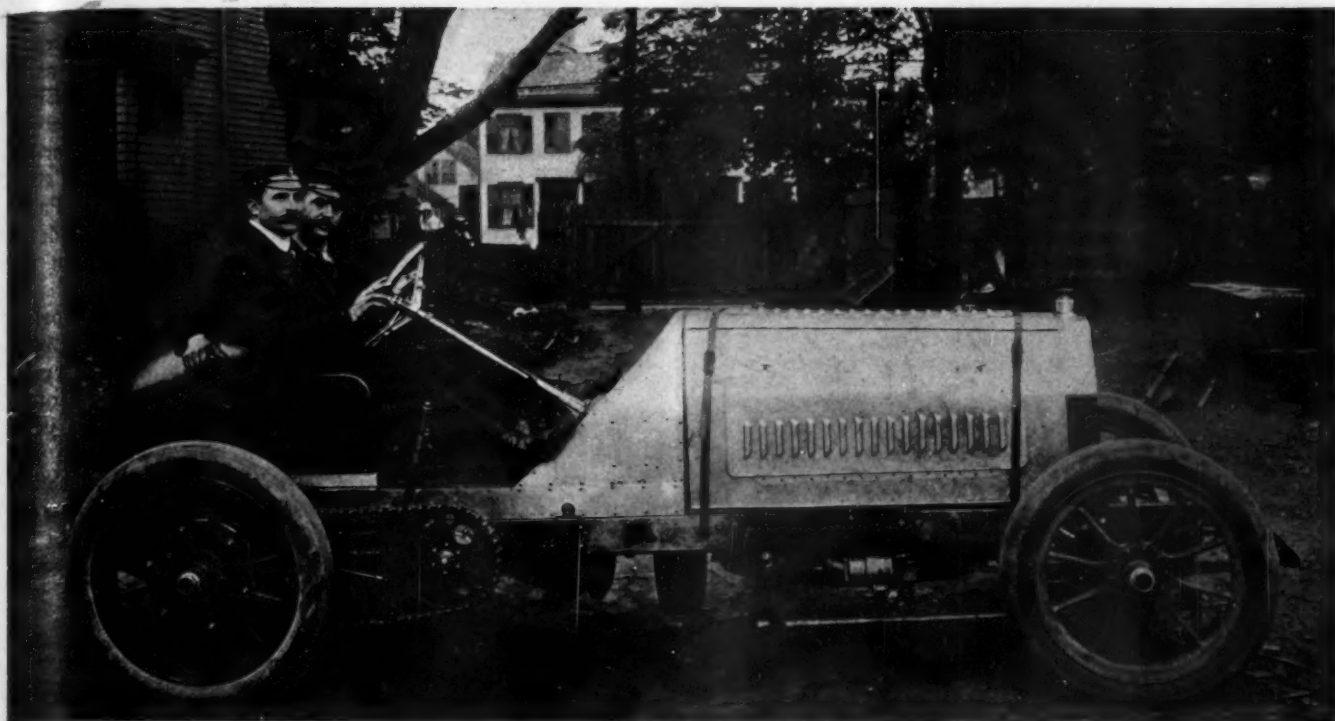
A. S. Mann, manager and chief engineer of the Hotchkiss factory in St. Denis, France, has come over for the Vanderbilt Cup race and has brought with him one of the new Hotchkiss



THE MEANS FOR CONTROLLING THE LOCOMOBILE RACING CAR.

The dashboard is placed at an angle and serves also as a foot-board. The driver has a very plain view of the instruments on the board.

six-cylinder cars, the first Hotchkiss car of its type to be imported to this side. The cylinders, which are cast in pairs, have a bore and a stroke of five inches each—in technical parlance, the cylinders are "square." Ball bearings are used throughout the car, including the crankshaft. The carburetor is built on the Mann system, having a needle-valve that is mechanically opened and closed to regulate the supply of gasoline. The chassis weighs 1,100 kilos, or about 2,500 pounds. An Eiseman high-tension magneto is used for generating the ignition current, the Eiseman concern being as yet the only one manufacturing high-tension magnetos for six-cylinder automobile motors. The car is but little larger than the 1906 four-cylinder model. Mr. Mann has the utmost faith in the future of the six-cylinder car, and predicts that with its development will come sooner or later, the abolishment of the gear-box and the change-speed lever. The six-cylinder Hotchkiss can run on the high speed from 2 kilometers, or about 1 1-4 miles an hour, to a maximum, under favorable circumstances, of 70 miles an hour or even more. The wheelbase of the car is 127 inches and the gauge standard, 56 inches. Front wheels are 875 by 105 centimeters (34 by 4 inches) and the rear wheels 920 by 120 centimeters (36 by 4 1-2 inches). Michelin tires are fitted. The price of the chassis, without body, as cars are almost invariably sold in France, is 25,000 francs, or \$5,000.



THOMAS FLYER 115-H.P. VANDERBILT CUP RACER, DRIVER GUSTAVE CALLOIS AT WHEEL, AND MECHANICIAN MARCEL POUXE.

THE THOMAS FLYER TRIO.

In the construction of the three Thomas "Flyer" candidates for places on the American team for the Vanderbilt Race no chances were taken, the machines being hand-fitted throughout where there was anything to be gained by hand work, and the most minute attention was given to the most insignificant details. All three cars are alike, so that one description fits the entire trio.

Each motor consists of four cylinders, cast in pairs with integral heads and water-jackets and mechanically operated valves, and the rating is given as 115 horsepower. High-tension ignition is employed. The radiator is, of course, of large dimensions in order to adequately cool the water-jacket for so powerful a motor.

Drive from the motor to the rear wheels is through a cone clutch, sliding-gear change-speed mechanism giving three forward speeds and a reverse, and heavy side chains to sprockets on the rear wheels. With a view to obviating the slippage that is difficult to avoid when a cone clutch is fitted to a very powerful motor, the clutch has been specially designed so that it is positively locked in position when fully engaged, eight finger-bolts slipping into corresponding recesses and absolutely preventing any slip once the clutch is driven home.

Good brakes are a necessity on a car that is to be driven over a course with many turns, and the Thomas cars are well equipped in this respect. Very heavy brakes are placed on the

rear wheels and operated by a hand lever in the usual way, while a band-and-drum brake on the countershaft is operated by a pedal and is to be used for all ordinary braking.

All wheels are 34 inches in diameter, and the rear wheels will be fitted with detachable rims, which are expected to reduce greatly the loss of time in case of tire trouble. Notwithstanding the use of these rims, the car is safely within the weight limit of 2,204 pounds, scaling just 2,109 pounds, 95 pounds on the safe side.

The weight of the car is kept down to some extent by the fact that the gauge is narrow, considerably less than the usual distance from wheel to wheel transversely. The wheelbase is 104 inches. There is a distance of 8 inches between the surface of the road and the lowest part of the car—considerably more than existed in some of the cars in last year's race.

Gasoline is carried in a tank having a capacity of 62 gallons, and the tank is placed under the seats of the driver and his mechanic, where it is out of the way and to a certain extent protected from accidental damage.

A Fast Try-Out in Buffalo.

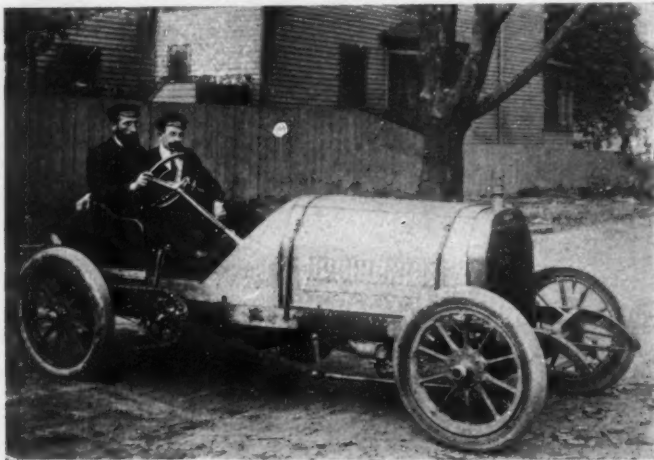
A try-out of the Thomas racers was held at Buffalo early Tuesday morning on a macadam road in the outskirts of the city. A four-mile stretch was utilized, and Le Blon was timed by Mr. Thomas and several others at a rate of speed which was slightly in excess of 123 miles an hour.



DRIVER MONTAGUE ROBERTS AND MECHANICIAN AUGUST ANDERSON IN THE H. S. HOUPPT THOMAS RACER.

After the trial Caillois gave this advice: "It is too fast. The many turns in the course will not permit such a high gearing. It is the car that can make what you call a quick getaway that will win the race, and any car that can go more than two miles a minute cannot get away fast."

As a result of this deduction new sets of sprockets were placed



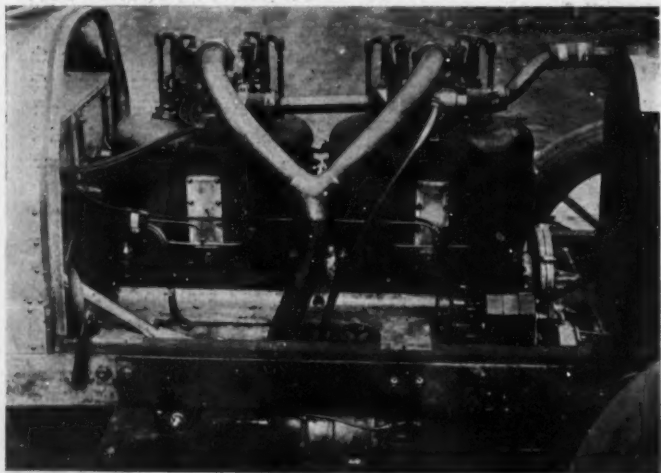
HUBERT LE BLON, WHO WILL DRIVE THE C. A. COEY THOMAS RACER, AND MECHANICIAN MARIUS AMIEL.

on the cars, geared for a speed of about 100 miles an hour. Those concerned in the trying-out at Buffalo expressed themselves as being more than satisfied with the showing accomplished.

The Three Entrants and the Drivers.

E. R. Thomas, the president of the company bearing his name; Harry S. Houpt, the New York agent; and C. A. Coey, the Chicago agent, are credited with the three entries. Mr. Thomas picked Callois as his driver, Mr. Coey was content to have Le Blon, and Mr. Houpt reiterated his confidence in Roberts, his American pilot of a year ago. Mr. Thomas enters his car through the Automobile Club of Buffalo, Mr. Coey carries the colors of the Chicago Automobile Club, and Mr. Houpt also competes under the emblem of the Bison.

The two French drivers, Callois and Le Blon, are of wholly different types, the former suggesting the embodiment of energy

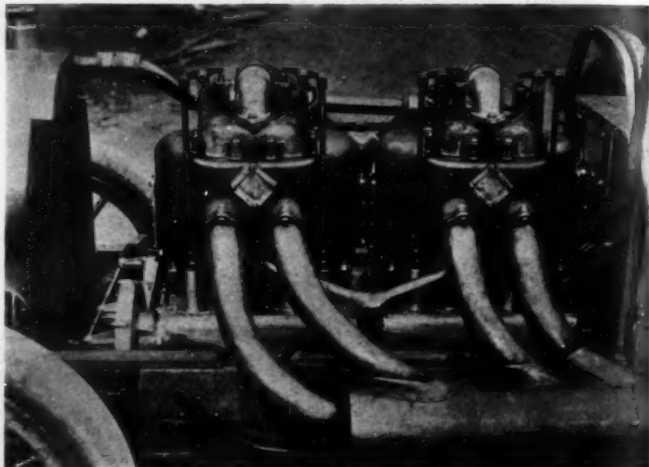


RIGHT SIDE OF MOTOR, SHOWING MAGNETO AND FUEL PIPES.

and stern determination, and the latter suggesting the student of care and dexterity. Callois, who is only 31 years of age, was a racing cyclist at the age of 18, and proved himself an excellent sprinter, under the name of Siollac, which is his name spelled backward, and which was used because of parental objection to his competing. He soon became interested in the automobile world, and his mechanical genius kept pace with his ability to drive

well, so that in 1900-'01 he was associated with the Peugeot company as an engineer and designer. Later Callois went to Serpollet, the French maker of steam-driven vehicles, and was associated with Le Blon, then in the employ of the same house. Since 1903 Callois has been with the Brasier company. Last year he finished second to Thery in the elimination race for the Gordon Bennett, and in the final was fourth to Thery, who finished first. Callois is at present an automobile and motor boat dealer in Paris. He is to act as the French agent for the Thomas Flyer under a six-year contract on his return home. His mechanic in the race will be Marcel Poux, a Frenchman.

Le Blon is 34 years of age, and for five years held world's records for steam cars, made by the Serpollet car. He has been prominent in French automobiling circles for the past ten years, the last few years having been spent in the employ of the Hotchkiss people. He was an entrant in the Grand Prix this year, but retired on the first day with a broken wheel. Le Blon was also entered to start in the recent Ardennes Circuit, but inability to secure detachable rims in time forced all the Hotchkiss entrants to be withdrawn. In some of Le Blon's recent races his wife has acted as his mechanic, and he states that she proved an excellent one. As Madame Le Blon decided not to come over for the Vanderbilt race, her husband's mechanic will be another Frenchman, Marius Amiel.



LEFT SIDE OF MOTOR. NOTE VALVE GEAR AND EXHAUST PIPING.

MOTORCYCLE TRANSCONTINENTAL RECORD.

Motorcyclists who think that they and their machines are well tested in endurance contests of the usual kind will be particularly interested in the recently completed run of Louis J. Mueller, who rode into Columbus Circle, New York, thirty-one days after starting from San Francisco—to be exact, thirty-one days and twelve hours. This is the best transcontinental time ever made by a motorcycle or by any other motor vehicle driven by one man. It is seventeen days better than the previous motorcycle transcontinental record. Mueller rode an Indian motorcycle, and stated that he had no accidents other than punctures, the machine running like clockwork all the way. The cyclometer registered 3,567 miles on reaching New York. Mueller's best day's run was the last, when he made 213 miles, from Fort Plain, N. Y. Notwithstanding the long trip, Mueller was fresh and well, and ready to continue his journey. He traveled only by day.

WINTON CO. TO BUILD IN PITTSBURGH.

PITTSBURGH, Sept. 10.—The Winton Motor Carriage Company of Cleveland, which a few months ago bought the property of the Hiland Automobile Company, of Pittsburgh, in Beatty street, East End, for about \$25,000, is considering the project of building a big garage on the lot the coming winter.

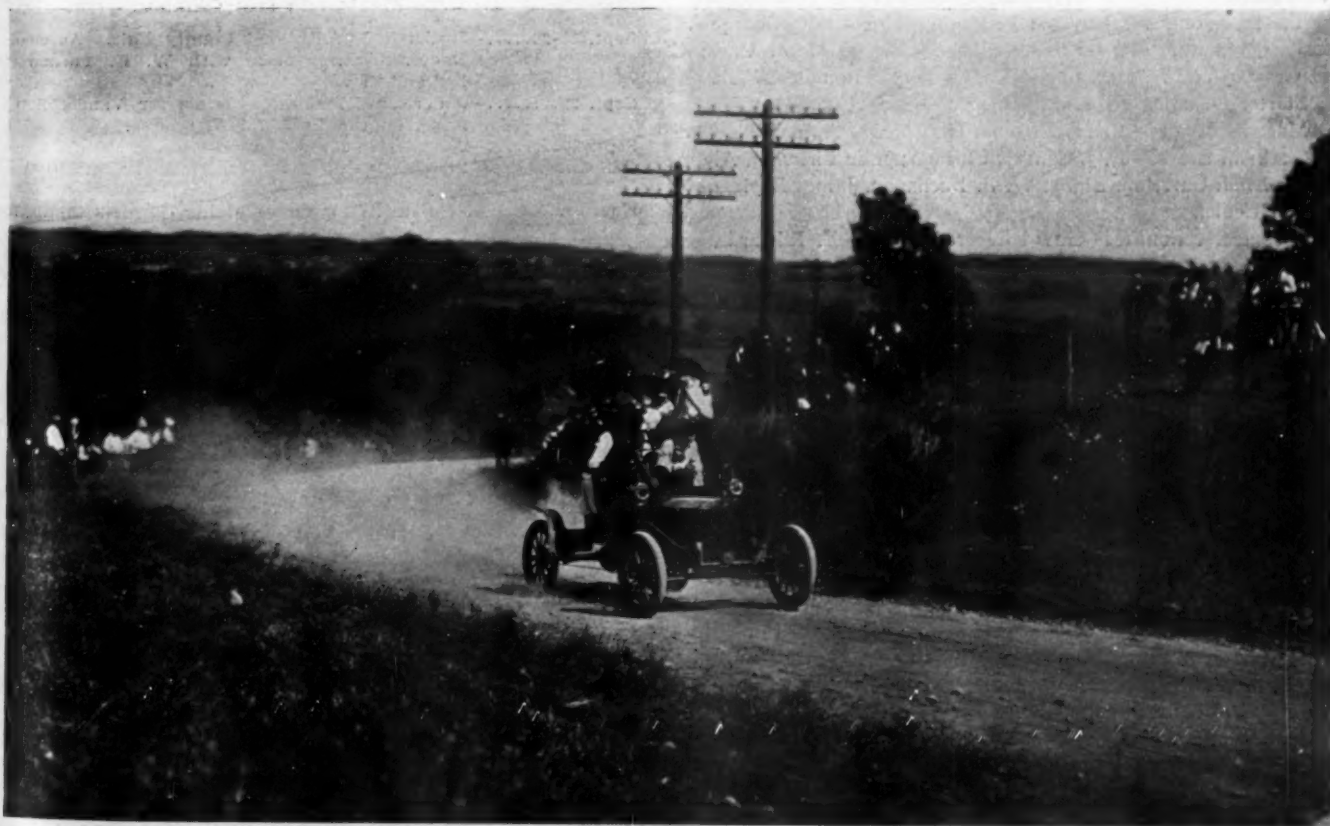
CONQUERING THE HILLS AT ALGONQUIN

CHICAGO, Sept. 8.—A big field of forty participants, all of whom endeavored to bring out the best that was in their cars and themselves and win in their respective classes, competed in the hill-climbing contests near Algonquin, Ill., Thursday, September 6, under the joint auspices of the Chicago Automobile Club and the Chicago Automobile Trade Association. The contests were clean cut and keen and aroused a great deal of interest among autoists of Chicago and vicinity. Henry Paulman's Pierce-Arrow, driven by J. V. Lawrence, carried off the big honors of the day by making the best time in the morning and tying with the Stevens-Duryea in the afternoon for the best time up Phillip's hill. In the morning Lawrence sent the car up Perry hill, a distance of a quarter of a mile, with two bends, in 34 seconds flat. Phillip's hill was half a mile long and curved the whole distance from bottom to top. The time made by the Pierce-Arrow and Stevens-Duryea up this acclivity was 46.2-5 seconds.

Algonquin is about three hours' ride from Chicago, either on the railroad or in an automobile. It is near the well-known Lake Geneva district. When the forty contestants made the trip to the town, village constables thought that a rich harvest was in store for them, but they did not reap what they expected, as the drivers were careful not to exceed the limit. After foiling these zealous guardians of the law the scene of the contests was reached. All preparations had been carefully made by the promoters and the different contests were held in shipshape fashion and speed. The scores were figured out by multiplying the capacity of cylinders in cubic inches by the time in seconds taken in climbing the acclivity and dividing this result by the weight of the car. The average of the two climbs counted in finding the total score. If a contestant did not compete in both events he did not figure

in the score. In class A James Levy won with 8.53 points to his credit. He drove an Autocar. The Buick was second, with 8.75 points. In Class B—for cars over \$1,000 and not exceeding \$1,750—R. Burnham won with a Jackson, his score being 8.74 points. The Buick, driven by W. C. Willetts, was second, with 9.35 points, and Joseph McDuffee and his Stoddard-Dayton, third, with 10.41 points. In class C a 28-horsepower Queen, driven by B. B. Bradley, won with 9.94 points. In this class the cars listed between \$1,750 and \$2,500. F. N. Nutt, with a Haynes, was second, with 10.30, and J. McDuffee and a Stoddard-Dayton third, with 11.67. The class D event was the best of the day, and proved to be easily the feature. In this contest the cars listed \$2,500 and over. J. V. Lawrence, in a 28-32 Pierce-Arrow, won with 9.08 points, and Joseph Paul, in a 40-48 Pierce-Arrow, was second, with 9.09 points. The contest was exceptionally close and brought out the fine points of each driver. There were two tests in the contests. A standing start was made in taking Perry hill and a flying start of a quarter mile was allowed in going up Phillip's hill. Frank X. Mudd, in his \$500 Ford runabout, furnished an interesting bit of excitement during the day. This car worked wonderfully well, making the climb of Perry hill in 0:55.2-5 after he had ascended it once, but sent back owing to the failure of the signal batteries to work. His second climb was made while the engine was hot. The Phillip's hill contest was a difficult one for Mudd, but he persevered and made it in 1:18.1-5.

Taking everything into consideration, the contests were as satisfactory as could be expected, and they will probably be made an annual event here. As far as can be learned there is no dissatisfaction felt over the handicap formula, which was an experiment tried for the first time in this country. Even the ones who were counted out by it declared it a fair test for all concerned, that it



FRANK X. MUDD IN 4-CYLINDER FORD RUNABOUT ON LAST TURN UP PERRY HILL, ALGONQUIN, ILL.

never was possible to get all conditions equal in an automobile contest, and that the scheme used seemed the best solution of the problem.

Summary of the Two Climbs.

	Per cent.		Total.
	Perry hill.	Phillip's hill.	
Autocar, Geyler & Levy.....	3.18	5.55	8.53
Buick, Buick Motor Co.....	3.88	4.87	8.75
Autocar, A. A. Belford.....	3.16	6.06	9.22
Maxwell, Maxwell-Briscoe Motor Co.....	5.20	6.21	11.41
Maxwell, Maxwell-Briscoe Motor Co.....	5.41	6.44	11.85
Mitchell, Mitchell Motor Co. Co.....	3.96	8.04	12.00
Cadillac, Cadillac Auto Co.....	5.42	8.55	13.97
Ford, Frank X. Mudd.....	6.40	9.09	15.49
Holsman, Holsman Auto Co.....	5.99	9.86	15.85
Holsman, Holsman Auto Co.....	7.66	11.25	18.91

CLASS B—CARS BETWEEN \$1,000 AND \$1,750.

Jackson, Hagmann & Hammerly.....	3.75	4.90	8.74
Buick, Buick Motor Co.....	4.30	5.05	9.35
Stoddard-Dayton, McDuffee Auto Co.....	4.03	6.33	10.41
Mitchell, Mitchell Motor Co. Co.....	5.10	8.19	13.29
Reo, Ralph Temple Auto Co.....	5.21	8.19	13.40
Rambler, T. B. Jeffery & Co.....	9.05

CLASS C—CARS BETWEEN \$1,750 AND \$2,500.

Queen, Branstetter Motor Co.....	4.06	5.88	9.94
Haynes, Haynes Auto Co.....	4.21	6.09	10.30
Stoddard-Dayton, McDuffee Auto Co.....	4.60	7.07	11.67
Mitchell, Mitchell Auto Co.....	4.61	8.16	12.77
Elmore, B. C. Hamilton.....	4.71	8.73	13.44
Queen, Branstetter Motor Co.....	6.00	7.72	13.72
Wayne, Wayne Auto Co.....	7.25	8.74	15.99
Rambler, J. F. Gunther.....	7.04	11.28	18.32
Rambler, T. B. Jeffery.....	10.30	19.50	29.80
Pope-Hartford, C. R. Horrie.....	4.70

CLASS D—CARS OVER \$2,500.

Pierce, Andrew McNally.....	4.00	5.08	9.08
Pierce, H. Paulman.....	3.82	5.27	9.09
Columbia, Electric Vehicle Co.....	4.05	5.30	9.35
Autocar, Geyler & Levy.....	3.73	6.56	10.26
Knox, G. A. Crone.....	4.73	6.10	10.83
Thomas, C. A. Coey.....	4.86	7.01	11.87
Stearns, Githens Brothers Co.....	4.90	7.26	12.16
Stevens-Duryea, F. G. Hsley.....	6.09	7.17	13.26
Pierce, Martin Beck.....	5.96	8.32	14.28
Apperson, N. H. Van Sicklen.....	4.91	12.90	17.81

Board of Officials in Charge of the Climbs.

Referee—F. C. Donald, Chicago Automobile Club.

Judges—W. H. Arthur, Chicago Motor Club; Sidney S. Gorham and L. E. Myers, Chicago Automobile Club; W. C. Thorne, R. W. Spangler.

Timers—John W. Hayden, Chicago Motor Club; George W. Erhart, Decatur, Ill.; G. G. Greenburg, Chicago Motor Club; C. E. Gregory and N. H. Van Sicklen, Chicago Automobile Club.

Starter—Charles P. Root, Chicago Motor Club.

Master of scales—Richard Bacon, Jr., Chicago Automobile Club.

Clerks of course—D. J. Canary, Chicago; John Chewing, Algonquin; L. H. Garrison, Elgin; W. B. Buchanan, James Bayless and A. J. Nicolet.

Technical committee—David Beecroft and F. E. Edwards.

HOW THE PAVILION GOT ITS ROOF.

DE KALB, ILL., Sept. 10.—Seven automobiles owned by as many citizens of this place put a red tile top on a park pavilion. It all happened from the efforts of the club and other women of the city to provide weary humanity a place to while away the time while viewing the beauty of the park. They planned a special function after they had tried in vain to get the business men of the place to subscribe enough money to finish it. At this function the feature was an automobile ride around De Kalb for the consideration of a dime.

It required the husbands of all of the women engaged in the work to prevent the people from climbing over each other to get such a ride for a dime. Each time the cars would roll up to the fair, which was held on the lawn of the Mayor of the town, there would be a perfect jam of people waiting their turn. Of course the owners of the cars donated their time and the service of their machines, and they were good-natured about it. The thing was kept up for two nights, and at the rate of a dime a ride it cleared \$50 a night. More than sufficient funds were obtained to roof the pavilion, and the women are praising the auto for so cleverly helping them out in an emergency.

HOTEL MEN DISCUSS CARE OF AUTOISTS.

COLUMBUS, O., Sept. 10.—The Chittenden Hotel of this city, one of the leading hostleries of the state, contemplates building a garage for the convenience of its large number of transient automobile guests. At the next meeting of the Hotelmen's Association, to be held at Toledo, the subject of "How to Best Care for the Autoist" will be considered. This matter was taken up at a special meeting of the executive committee of the association, held at Cedar Point last Friday. Leading hotel managers from the large cities of the state attended the meeting.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Shows.

- Sept. 22-29.....—First National Automobile Parts Show, First Regiment Armory, Chicago; A. M. Andrews, Secretary, 184 La Salle Street, Chicago.
- Dec. 1-8.....—Seventh Annual Automobile Show of the Automobile Club of America, Grand Central Palace, New York City, under the patronage of the American Motor Car Manufacturers' Association.
- Jan. 12-19.....—Annual Automobile Show of the Association of Licensed Automobile Manufacturers, Madison Square Garden, New York City.

Tours.

- Sept. 14.....—San Francisco, Cal., 140-mile Endurance run of the Automobile Club of California to Del Monte.
- Sept. 22.....—Worcester, Mass., Gymkhana and Filled Day of the Worcester Automobile Club, at Worcester Oval.
- Oct. 1-2.....—St. Louis, Mo., Automobile Parade and Carnival, St. Louis Automobile Club.
- Oct. 2-6.....—Endurance Run and Tour of the Binghamton (N. Y.) Automobile Club, to New York and the Vanderbilt Cup Race.
- Oct. 6.....—Tacoma, Wash., Automobile Day of the Tacoma Automobile Club at Puyallup Valley Fair.
- Oct. 20.....—Philadelphia, Pa., Cross Country Run of the Philadelphia Automobile Club.

Race Meets and Hill Climbs.

- Sept. 18-20.....—Rutland, Vt., Rutland County Fair. Automobile Races. Entries close with W. K. Farnsworth, Rutland, Vt.
- Sept. 22.....—American Elimination Trials for Vanderbilt Cup Race, on the Long Island Course.
- Sept. 26.....—Joplin, Mo., 100-mile Road Race on 25-mile Circuit.
- Oct. 6.....—Vanderbilt Cup Race, American Automobile Association.
- Nov. 29.....—Riverside, Cal., Thanksgiving Day Hill Climb, Box Springs Grade Hill.
- Jan. 22-26.....—Ormond-Daytona (Florida) International Race Meet. Florida East Coast Automobile Association.

Motor Boat Races.

- Sept. 10-15.....—National Motor Boat Carnival, Hudson River, New York City. Under the auspices of the Motor Boat Club of America.

FOREIGN.

- Oct. 5-14.....—Leipzig (Germany) Exhibition, Krystall Palast.
- Nov. 1.....—New Zealand International Exhibition opens at Christchurch.
- Nov. 1-16.....—Berlin (Germany) Automobile Exhibition.
- Nov. 15-24.....—London Olympia Motor Show.
- Nov. 23-Dec. 1.....—London Stanley Show, Agricultural Hall.
- Dec. 7-23.....—Paris, Ninth Annual Salon d'Automobiles, Grand Palais.
- Dec. 15.....—Calcutta, India, Exhibition of Automobiles, etc., Automobile Association of Bengal.

Race Meets, Hill-Climbs, etc.

- Sept. 27.....—Tourist Trophy Race, Isle of Man, A. C. of Great Britain.
- Oct. 7.....—Chateau Thierry (France) Hill Climb.
- Oct. 23.....—Gallion (France) Hill Climb.
- Oct. 30.....—Start from Paris of the Gordon Bennett Aeronautical Cup Race.

THE REPAIRING OF PNEUMATIC TIRES

By H. W. PERRY

WITHIN the last year the industry of repairing worn and damaged automobile tires has grown to surprisingly large proportions. Whereas four or five years ago pneumatic tires had to be sent to Europe for repairs, and two or three years ago the repair work in this country was practically a monopoly in the hands of a very few tire manufacturers, there are now a dozen tire repair depots in the city of New York alone. Most of these are maintained by branch houses of the large tire manufacturing concerns of Akron and Hartford and American agencies of foreign houses, but in addition there are a number of independent concerns that make a specialty of the work. The largest repair stations in the city are those of the Diamond Rubber Company, the Hartford Rubber Works Company, Goodyear Tire & Rubber Company, B. F. Goodrich Company, Continental Caoutchouc Company, Michelin Tire Company, and the Healy Leather Tire Company. Several of the largest of these depots were not put into operation until this year. In making a study of the subject of tire repair work it is of interest to observe the difference in the European and American methods.

Automobilists in general do not seem to realize that a large part of the cost of car maintenance can be saved by economizing in tire replacements. Many a tire that is consigned thoughtlessly to the scrap heap could be made almost as good as new by patching and retreading; and to all appearance such a tire is a new one. When honestly repaired by competent workmen, a patched and retreaded tire will give from 2,000 to 4,000 and sometimes 5,000 miles of service. Cost of the work varies, of course, according to the nature of the job and the size of the tire; but for \$25 one can get an ordinary blowout or cut repaired and a new tread put on a worn tire that will make it look like new and save the purchase of a new tire costing \$50. In some shops patching work is charged for by the lineal inch according to the size of the tire, although this is not a fully satisfactory basis, since some jobs require much more work than others of no greater dimensions. Prices for all repair work have been reduced from one-half to one-third within two or three years, so that it is well worth while now to send damaged pneumatics to the repair shop unless the fabric is rotten or has been allowed to wear clear through to the inner layers. Most tires have a floating strip or two of coarse heavy canvas, imbedded in the pure rubber tread. When the tread has worn down to this, one should not put off retreading until this strip has worn through, for it is

a protecting or "bricking" strip for the purpose of saving the inner layers of fabric from damage.

Recovering or Retreading.

Repair work on pneumatics is divided into several branches, as patching, recovering or retreading, and inner tube work. Each of these is in turn subdivided into different successive processes. Recovering is a simple operation. In the first place a workman takes the shoe and "strips" off as much of the old loose rubber as possible by tearing with his hands, as in Fig. 1. When the rubber resists this, a common kitchen knife sharpened on a coarse stone to a rough edge and frequently dipped into water is used for paring off the remaining rubber, which comes away in small, ragged strips, care being taken not to cut into good fabric. Most of the old rubber having been thus removed, the shoe is taken to the "buffer."

This is a power driven steel wire brush wheel about eight inches in diameter against the revolving edge of which the surface of the tire is held (see Fig. 2) until all of the excess rubber has been ground off and the surface nicely rounded, leaving a roughened surface admirably adapted to retain the rubber cement with which the entire surface is painted after it has been washed with gasoline. This cement coating is allowed to dry and a strip of sheet rubber is cut to the right dimensions to entirely cover the



FIG. 1.—STRIPPING OFF THE OLD RUBBER AND WORN FABRIC.

shoe. The sheet rubber comes from the factory in fifty-pound rolls wound with a sheet of muslin between the layers to prevent sticking, as the raw or unvulcanized rubber is very plastic and sticky. The sheet of rubber is an eighth of an inch thick and a yard wide, and is drab colored. It is applied as in Fig. 4.

The tread of a tire wears most on the center line, except in cases where it has worn on the sides because of excessive driving in street car tracks or has scraped against a mud guard or other projecting part of the car. The tread therefore has to be built up in the middle, so three layers or strips of rubber are cut, of different widths, the narrowest being about two inches wide, the next four inches, and the last wide enough to reach well down on both sides of the shoe. In the better equipped shops the benches are provided with circular iron mandrels or with wood forms shaped to the segment of a circle and nicely rounded to fit inside the tire shoe. The use of these greatly facilitates the processes of stripping and of applying the strips of rubber when retreading or patching. It is unnecessary to apply rubber cement



FIG. 2.—"BUFFING" OFF ROUGH RIDGES OF RUBBER.

between the several layers of rubber, as they vulcanize together without it. Having progressed so far, all that remains is to vulcanize the tire. This is a process by itself through which all tires have to go, so it will be taken up separately later.

There are a number of special treads that come ready made from the factory for application to the shoe, as the Bailey rubber studded tread, and flat corrugated treads for racing tires. These are made of thick rubber and with a thickened tread of special shape, so that no underlying strips of sheet rubber need be put on the shoe before their application.

Should the shoe be worn much on one side, it becomes necessary to build it out there by extra layers of rubber to preserve the proper contour of the section after the final covering strip is applied.

Patching a Cut or Blow-out.

Patching is a much more difficult job than recovering. Usually the tires received at the shops for renovating are not only badly worn on the tread, but have the fabric ruptured by blow-outs or cuts. In such cases the rubber tread is first stripped off, then two or three layers of the canvas are cut away in rectangular form at the place of rupture, the



FIG. 3.—ROLLING NEW CANVAS INTO PLACE IN PATCH.

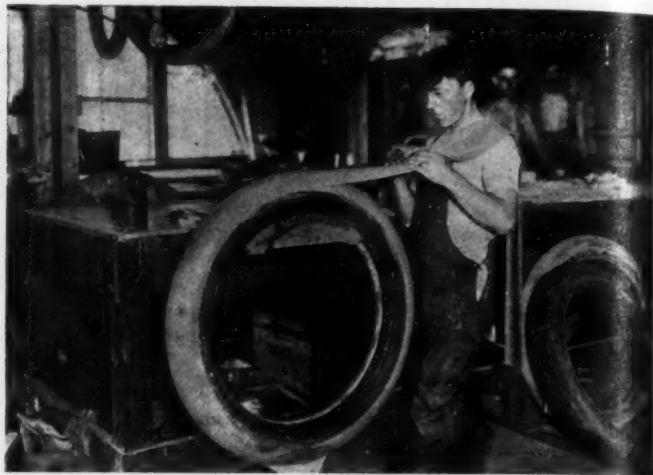


FIG. 4.—RETREADING—PUTTING ON LAST STRIP OF RUBBER.

largest section being cut from the outermost layer and a smaller section from each successive layer until only two or three plies of canvas are left. The section from which the material is thus removed will usually measure a foot or more in length by the full width of the tire, the cutting extending well around toward the beads on either side. When this trimming has been finished, the tire goes to the buffer, where the lumpy rubber that adheres to the fabric is smoothed off. After washing with gasoline a coating of rubber cement is painted all over the damaged place, and the shoe is hung up to dry for a time.

The next process is to cut pieces of canvas from stock that comes in rolls from the rubber factory with a coating on one side or both sides. These pieces are cut to just the right size to fit into the cut-away places in the different layers of fabric in the tire, and are laid smoothly into place, being rolled down into close contact, as in Fig. 3. Layers of sheet rubber are laid over them until the tire has been built up to the right thickness and rotundity, when the final strip of rubber for the new tread is put on and the shoe is ready for vulcanizing.

There are variations from this method in the different shops; in those where the European practice prevails and foreign workmen are employed the built-in layers of canvas are stitched down onto the layers that were left in the shoe, a special heavy sewing machine being used for the purpose. But in the American practice no stitching is done. The purpose in both, however, is merely to replace the removed material with new, and to have the patch as strong as the original tire. In domestic work the overlapping of the layers of fabric is depended upon for this, as the rubber coating vulcanizes the plies firmly together.

"Section Work" or Local Treatment.

In many cases "section work" only is required; that is, a cut or blow-out has to be mended in a tire that is otherwise in fair condition. In this case the treatment is local only, and no outer strip is placed around the whole tire. In some shops, as in the Diamond and Goodyear, the repaired tire is vulcanized after mending a rupture in a sectional vulcanizer that will heat a portion a foot or more in length, but in other shops the entire tire is placed with others in the big steam tank used for vulcanizing retreaded tires.

Sometimes short strips or patches of the solid rubber are torn from the tread of a tire, without injuring the underlying fabric. When this happens, the edges of the torn rubber are pared down smoothly and beveled off, the ridges of rubber that still adhere to the canvas being scraped off by the buffer or by wire hand brushes, as in the Continental tire depot. A piece of solid rubber of the required thickness

is then cut from stock to just the right shape to fit into the hole, cement is applied and the shoe is ready for vulcanizing.

Vulcanizing with Live Steam.

The best equipped shops have large steam vulcanizers, into which a number of shoes can be placed for heating in live steam under pressure. Last week the Healy Leather Tire Co. installed one as large as the boiler used for heating a large sky scraper office building. It is cylindrical, twelve feet long, and has a five-foot door. Forty-five tires can be vulcanized simultaneously in it. One almost, if not quite, as large, is in operation at the Continental depot. The doors of these open at the end, swinging back on a vertical hinge. The Diamond and Goodyear shops have vulcanizers of another form with the door on top (Fig. 9), but in addition they have sectional vulcanizers that make it unnecessary to place many of the repaired tires in the big vulcanizer. In the sectional vulcanizers the live steam does not come into direct contact with the tire, the heat being communicated through a cast-iron mold that is divided so that it can be placed around the mended part of the shoe, and then inserted in the stationary part of the heater, to which the steam is admitted.

Different means are used in the various shops for preserving the shape of the tires while they are undergoing vulcanizing. The heat softens them so that they would flatten out if not held by some means. The German practice is to place the shoe on iron forms or mandrels that are made expansible, so that they can be spread after being inserted in the shoes. Other shops use coiled springs of different sizes and lengths to fit inside of the shoes, as seen in Fig. 5. Still others employ for the same purpose extra heavy air tubes covered with canvas and inflated with compressed air.

After the tire has been placed on the form, the entire shoe with the form inside is wrapped round and round with a strip of muslin between two and three inches wide, the edges just overlapping. This muslin prevents the rubber, when softened by the heat, from sticking to the other tires with which it is in contact, and it is the cloth that leaves the impression of fabric on the surface of all tires as they come new or repaired from factory or shop.

After wrapping, the tires are stacked in the vulcanizer, the heavy door is closed and screwed tight, and the steam turned on. There is considerable variance in the length of time and the steam pressure used in vulcanizing, due in large part to the nature of the rubber used. The practice ranges from the use of live steam at thirty-five pounds pressure for a period of forty minutes, to seventy-five or more pounds pressure to the square inch for an hour. The greater the pressure and the longer the time the harder becomes the rubber. When the tires come out of the "boiler" they are unwrapped, the forms are removed and powdered soapstone or chalk is



FIG. 5.—REMOVING TIRES FROM THE BIG STEAM VULCANIZER.

rubbed on the tires, as in Fig. 6. At first the rubber is nearly black, but as it cools off the sulphur contained in it comes to the surface, and it "blooms" out gray. The soapstone also whitens it and removes its sticky character. The repaired tires are now ready for shipment to their owners.

Not infrequently the beads at the edges of the shoe are badly worn by rubbing against rusty rim edges, and have to be mended, or they may be cut through. The Healy shop makes its own new beads in a special vulcanizing machine in which the canvas and rubber strips are given shape in metal forms. These beads are used also for the purpose of holding in shape the beads on the shoes when they are being vulcanized, being wrapped in place under the muslin with which the tires are wound.

Mending Inner Tubes.

"Tube work" is another branch of the business. Most of the work required is patching, inserting new valves and putting in new tube sections. The first move is to determine where the leak is by partially inflating and immersing the tire in a tank of water, as in Fig. 7. When a small blowout has to be mended, the damaged place is cut away cleanly,



FIG. 6.—UNWRAPPING VULCANIZED TIRES AND SOAPSTONING.

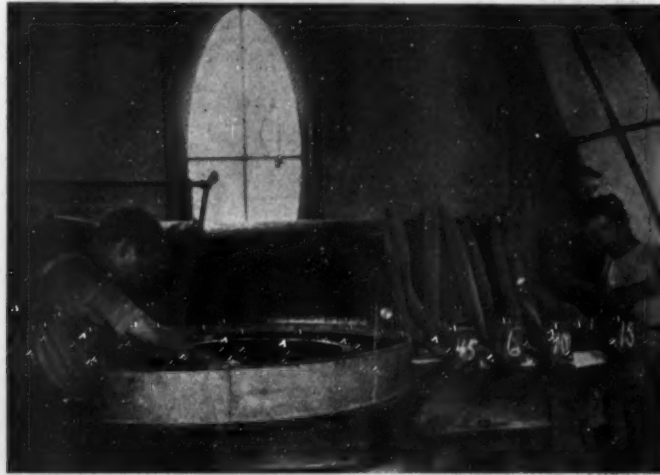


FIG. 7.—TESTING AND VULCANIZING INNER TUBES.

the edges of the hole are washed with gasoline inside and out, and a patch of strong rubber two or three times as large as the hole is cemented in place (Fig. 8). That portion of the tube is then placed in one of the small vulcanizers seen to the right of the testing tank (Fig. 7) with weights at the ends of the sticks.

Putting in a new section requires cutting out an arc of the old tube, turning the ends of the remaining part inside out

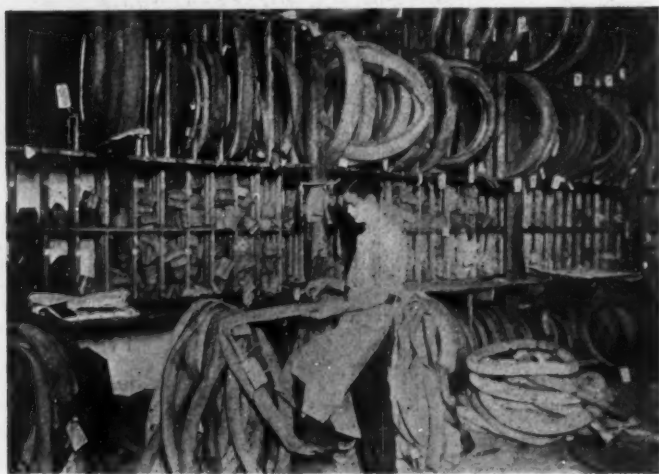


FIG. 8.—PATCHING INNER TUBES.
Note large stock of tires for repair and attached order tags.

over small wooden forms of the right diameter, washing the surface with gasoline and coating with rubber cement. A section of new tube about ten inches longer than the cut-away part is washed with gasoline at the ends and the outer surface coated with cement. The cement is permitted to dry partly, and then the ends of the tube are turned back right side out over the ends of the new section, so that the cemented surfaces are in contact. Next the abrupt ends of the tube at the joint are pared down with a wet knife to a bevel edge, and vulcanizing completes the job.

Extent of the Business.

The extent of the tire repair business in New York City may be judged from the fact that several of the larger shops

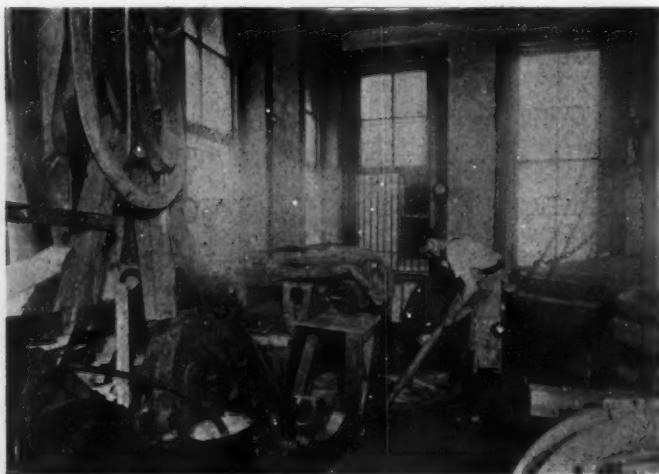


FIG. 9.—CORNER OF A SHOP SHOWING KETTLE TYPE OF VULCANIZER, FORMS FOR SECTIONAL VULCANIZER, ETC.

repair from fifty to one hundred tires a day. It is claimed that several of the shops in the metropolis are larger than those anywhere else in the country, not excepting the repair departments of the great tire factories in Akron. Two of the largest employ regularly this summer sixteen men each,

all the most expert to be had. In one of these more than half of the workmen learned their trade in the tire factories of Europe. The business has grown so rapidly that it is very difficult to secure good workmen and they command high prices. Just now every repair shop in the city has all the work it can take care of.

For the information contained in this article and the photographs that accompany it, we take pleasure in acknowledging the courtesy of the New York houses of the Diamond Rubber Company, the Healy Leather Tire Company, the Continental Caoutchouc Company, and the Goodyear Tire & Rubber Company.

TRADE OUTLOOK IN BRAZIL.

Consul General George E. Anderson, stationed at Rio de Janeiro, writes that at the present time there is a very encouraging outlook for American made automobiles in that city and vicinity.

There has been a building boom in progress in the city for some time, and it has taken the form, among others, of a boom in the construction of several fine avenues and a boulevard system which contemplates something like seventeen miles of an asphalt drive along the bay. Naturally such an opportunity for automobiles is attractive, and there are not only a large number of machines now in use, but the number is rapidly increasing. In line with the general trade situation here, the natural disposition of Brazilian buyers has been to go to Europe for their machines, but there are a number of good American machines here, and it seems probable that all that is necessary for more American trade in this line is proper efforts to sell the American machines. It is a matter of fair competition in a fair field, and that American manufacturers have not sold more machines is due to the lack of efforts in that behalf. In a city which, with its suburbs, reaches well toward a population of a million, there is a considerable field for further effort. There seems to be no preference in the way of machines, all grades of all kinds at all prices being seen in use. As elsewhere, the majority of the automobiles in use are of medium grade and medium price.

There is a similar, though smaller, field in most of the cities of Brazil, and, with the general wave of improvement now sweeping over these cities, there will likely be increased demand for automobiles. Outside of the cities there is very little demand, in most places none at all. The settled portions of Brazil cover rough country, in which improved roads are practically unknown, and while there are exceptions to the rule, of course it is probable that there will be little demand for automobiles in country districts for a long time to come. American manufacturers desiring to get into the Rio Janeiro market may be able to accomplish something by addressing the firms whose addresses can be obtained from the Bureau of Manufactures.

"There are twelve automobiles in this consular district, or, to speak more definitely, in the city of Athens," writes Consul Horton, of Athens, Greece, to the State Department. "Three of these belong to the king and the princess. Most of the automobiles in use here were bought in France at a cost of from \$772 to \$1,930. Automobiles are classed by the tariff law as four-wheeled carriages, which, upholstered or not, used or unused, pay a duty of \$59.70 each, besides octroi, etc. In the case of a high-priced carriage, with sumptuous furnishings, duty is assessed on value declared in invoice and bill of lading, and importers are advised to obtain an invoice from the Greek consul in the country from which the shipment is made. In this latter case the duties are 20 per cent. of assessed value, \$25 octroi, and 5 per cent. on the 20 per cent. Parts or accessories pay according to their assessed value. Automobiles are classed as carriages for the reason that machinery is admitted into Greece free of duty."

AUTOMOBILE REAR AXLE CONSTRUCTION

AUTOMOBILE rear axles may be divided into two broad classes—"live axles," in which are incorporated the means for transmitting to the wheels the power of the motor; and "dead axles," which are stationary with relation to the wheels and serve only to carry the weight of the car and to provide bearing surfaces for the wheels, which are commonly chain driven from a countershaft when a dead rear axle is used. Dead or stationary axles are usually of steel, of I-beam, rectangular, or other cross-section, straight or dropped, with the necessary spring seats and supports for brake connections either forged integral or mechan-

rotating shafts and for the road wheels. In the case of a car with single chain drive a sprocket, instead of the bevel gear, is mounted on the differential casing, and the shaft and pinion give place to the chain, which passes through openings in the casing.

Referring to the drawing, Fig. 1, the foundation of the whole rear axle group is the tubular casing *AA*, which is made integral with, or is rigidly secured to, the enlarged central casing *B*, which incloses the differential and the driving gears. This casing is often divided in the middle, as shown, and the two halves bolted together to form a rigid hollow structure reaching from wheel to

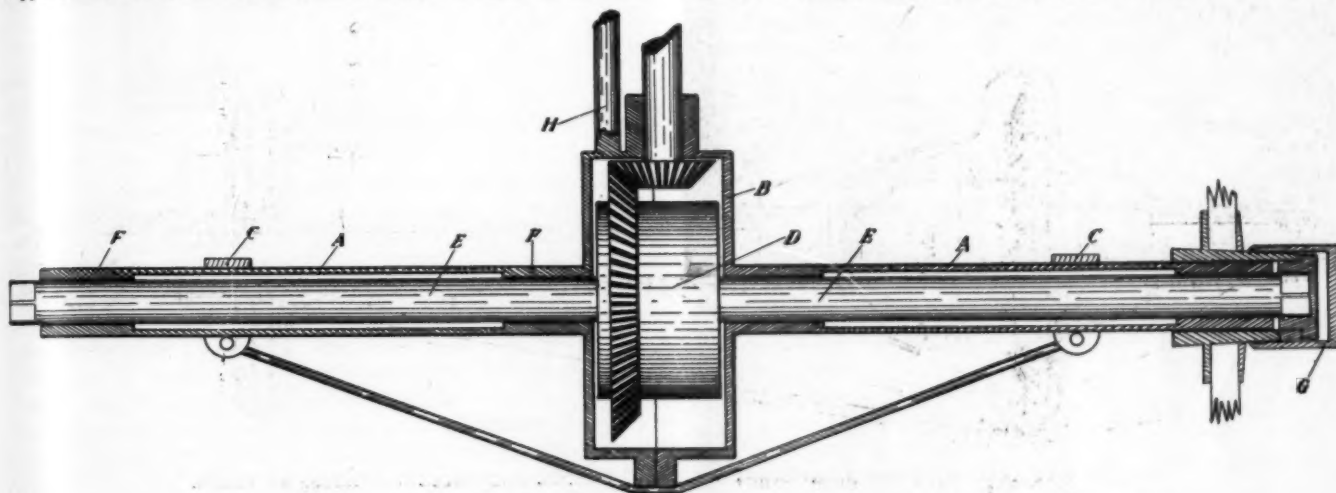


FIG. 1.—DIAGRAM OF A COMMON FORM OF LIVE REAR AXLE WITH WHEELS ROTATING ON THE TUBES.

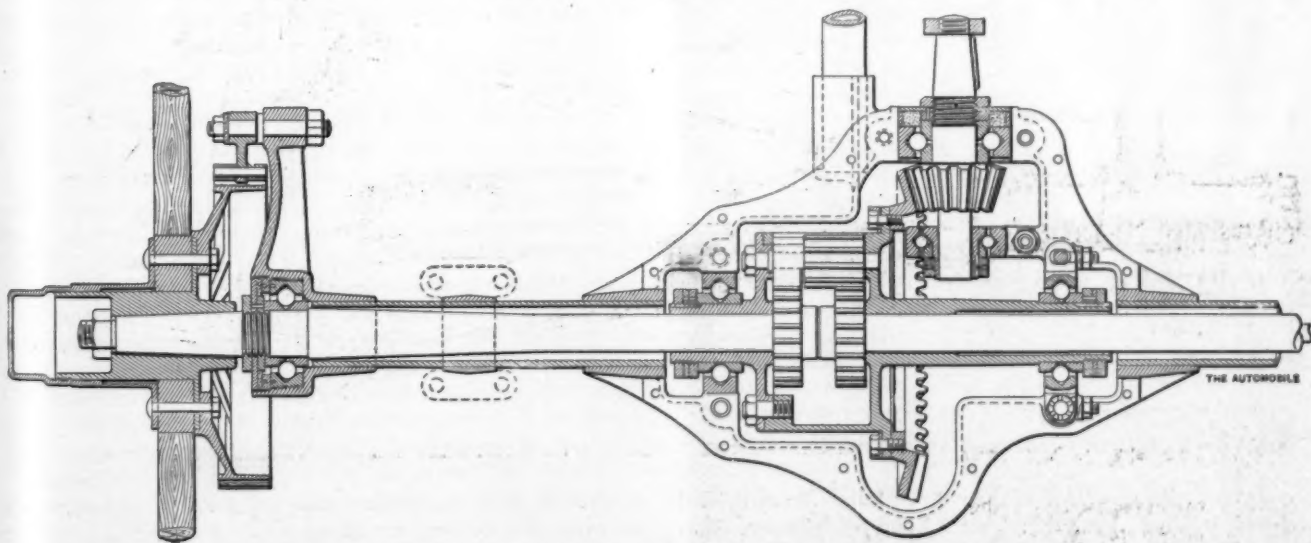


FIG. 2.—REAR AXLE WITH BALL BEARINGS AND SPUR DIFFERENTIALS. WHEELS ARE KEYED TO ENDS OF LIVE SHAFTS.

ically attached. Tubular rear axles of the dead type are rarely seen, though not unknown to automobile builders.

Construction of a Typical Live Rear Axle

The live rear axle is a very different affair, comprising as it does the mechanism necessary to perform several functions. The live rear axle embraces a whole group of parts which are usually, for the sake of convenience, considered part of the axle, as all are usually, though not invariably, enclosed in a single casing. In Fig. 1 is shown diagrammatically the construction of a common type of live axle. It will be seen that this axle has to support the weight of the car, drive the rear wheels, carry the differential and the bevel driving gears, and provide bearings for the various

wheel. This part of the rear axle does not rotate with the wheels, but is stationary, like a dead axle, carrying spring seats *C*, to which the rear springs are secured. On the ends of the tubes are formed bearings for the road-wheel hubs, and the wheels turn on these bearings—which may be plain, roller or ball bearings—just as they would on a solid stationary axle.

It is now necessary to provide a method of driving the road wheels. Through the differential casing *D* extend the shafts *EE*, fitted into and rotating with the gears of the differential. These shafts turn in bearings—plain, ball or roller—in the axle casing, as at *FF*. The outer end of each shaft projects through the open end of the tube, the protruding part being square or fitted with a key, and the outer end of the wheel hub also projects somewhat

beyond the end of the axle tube upon which it turns. It is now only necessary to apply a connecting device between the end of the shaft and the end of the wheel hub. For this purpose the outer end of the hub is castellated, while a cap, with castellations corresponding with those in the hub, is slipped over both shaft and hub, fitting over the squared end or having a keyway to engage the key on the shaft. This provides a positive drive from the shaft to the wheel. An advantage of this driving system is that when both ends of both live shafts are squared—as is very often the case—the shafts can be slipped into square holes in the differential gears and held in position by the castellated driving caps, and when the caps are removed, the live shaft can be slipped out without disturbing any other parts of the rear axle system. In order to keep out dust and at the same time retain oil, a cap

sliding or telescopic joint, or is pivoted in the same axis as the pivots of the distance rods which extend from the axle to the frame and keep the axle at right angles to the frame.

In many cases the rear axle is made with the road wheels keyed to the outer ends of the live shafts, instead of running on the tubes. Thus the live shafts have to share in the duty of carrying the weight of the car as well as driving the wheels. The construction differs but little from that of the rear axle of the floating type first described, the road wheels being merely transferred from the tubes to the ends of the shafts.

In Figs. 2, 3 and 4 are shown live rear axles as actually constructed, the arrangement and proportions being those of axles in common use. With the aid of the simplified diagrams the reader will be able to comprehend these more complex drawings

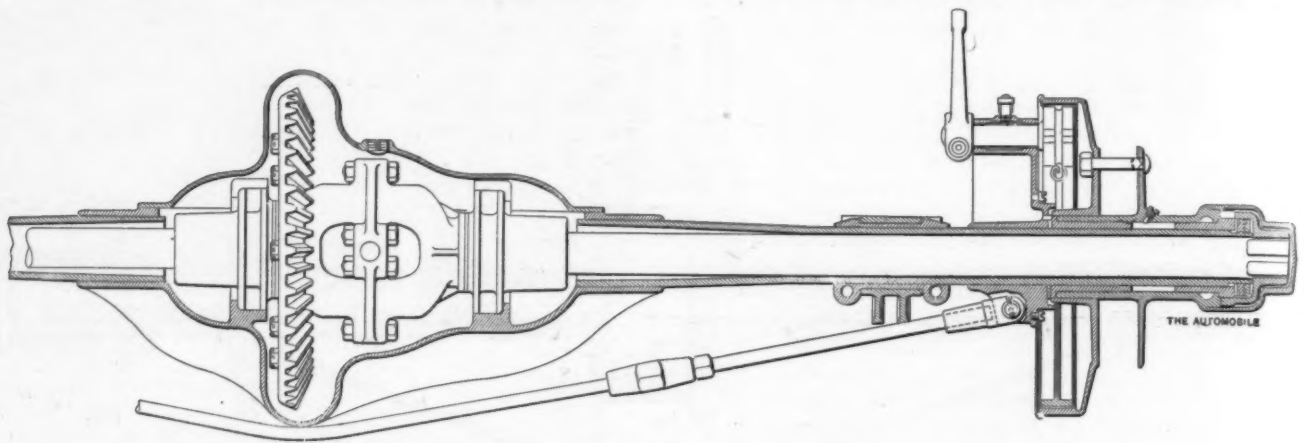


FIG. 3.—REAR AXLE WITH PLAIN BEARINGS, BEVEL GEAR DRIVE AND WHEELS RUNNING ON TUBES.

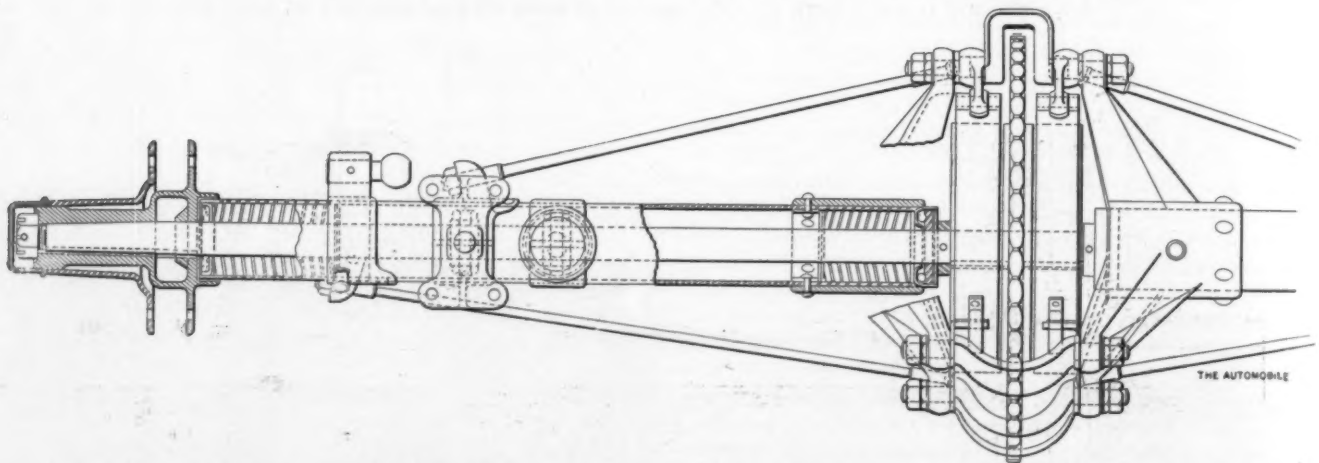


FIG. 4.—DOUBLE TRUSSED REAR AXLE WITH CHAIN DRIVE SHAFTS ON ROLLER BEARINGS AND WHEELS KEYED TO SHAFTS.

is screwed over the outer end of the hub, enclosing the castellated driver and usually preventing it from shifting out of place. This is the highly polished hub cap that is seen on every automobile wheel. The central casing, enclosing the differential, is commonly fitted with a removable cover, so that the differential gears can be uncovered and examined without taking down the whole axle, and lubricant can be inserted easily. Often a truss rod is fitted under the axle casing, as shown.

The thrust of the bevel driving gears against the resistance of the road wheels causes the axle casing to have a tendency to rotate in a direction opposite to the rotation of the live shafts and the road wheels. This must, of course, be checked, and a rod, usually called a torsion rod, is secured to the differential casing and carried to some stationary part of the car, such as one of the transverse frames. As the frame of the car is constantly rising and falling on the springs, thus changing the distance between the frame and axle, the torsion rod is usually either fitted with a

and to see how the various parts are built up and secured together to form a complete axle.

Live Rear Axle with Continuous Shaft.

A form of live rear axle in which the central division of the shaft is avoided is shown in Fig. 3. This form of axle is frequently used when there is a single chain drive to a sprocket placed near one of the rear wheels instead of in the center of the axle. One wheel is secured to shaft *B*, which extends unbroken from wheel to wheel, but carries only one wheel. The opposite wheel is secured to sleeve *A*, which extends well toward the opposite end of the axle and encloses shaft *A*. One of the large gears of the differential is secured to the shaft *B* and the other to the sleeve *A*. This arrangement is equivalent to a divided rear axle with one of the live shafts telescoped into the other. The shaft *B* and sleeve *A* of course share in carrying the weight of the car. This form of rear axle may of course be used with the

differential and driving gears or sprocket placed in the middle, though the divided rear axle is commonly used in such cases.

There is on the market a live rear axle for single chain or propeller shaft drive, in which no differential gear is employed. The axle consists of a straight one-piece round shaft with the sprocket for single chain drive, or bevel gear for propeller shaft drive, as the case may be, keyed to it. The wheels are not keyed to the

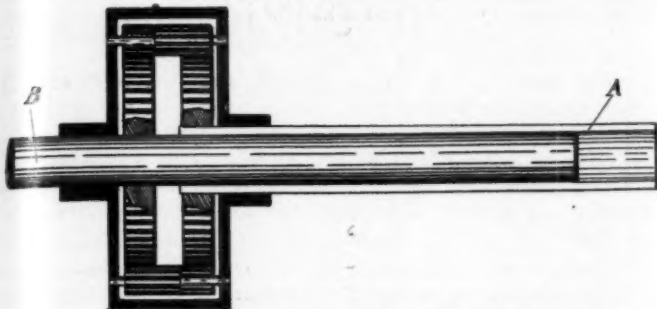


FIG. 5.—LIVE AXLE WITH UNDIVIDED SHAFT AND SLEEVE.

shaft, however, but are mounted on what may be termed screw clutches, one for each wheel. The axle turns in bearings of any convenient type. When the direction of the car causes one wheel to travel faster than the other, the fastest moving wheel unclutches itself automatically and runs free and the slow-running wheel takes the drive. By a special arrangement of the clutches the differential action will take place when the car is running backward. The effect of the clutches may, for the sake of explanation, be compared to that of ratchets.

We are indebted to the kindness of the American Ball Bearing Company, of Cleveland, O.; the Standard Roller Bearing Company, of Philadelphia, Pa., and the Diamond Chain and Manufacturing Company, of Indianapolis, Ind., for drawings of and information regarding axles illustrated and described in this article and the preceding one on front axles.

DENATURED ALCOHOL IN CANADA.

The question of freer use of denatured alcohol is claiming the attention of persons in this country engaged in scientific and industrial enterprises, as well as the officials of the Government who will be charged with the execution of the act of Congress providing for free alcohol in the arts and sciences, which will go into effect January 1, 1907.

The Dominion of Canada for about fifteen years has granted alcohol free of tax for scientific and industrial purposes, and since 1890 the government has directly controlled the manufacture and sale of methylated spirits. Prior to that time the business was carried on in licensed establishments under governmental supervision. Methylated spirits, a combination of wood and grain alcohol, is sold by the Canadian government at from \$1.10 to \$1.50 per gallon, according to grade. The former is composed of 25 per cent. wood and 75 per cent. grain alcohol, and the latter 50 per cent. wood and 50 per cent. grain. The lower grade is supplied to manufacturers under a bond, and is used in certain lines of manufactures. The higher grade is sold to any person without bond. Hon. William Templeman, minister of inland revenue, in a recent letter to the Canadian manufacturer, explains that the question for solution in Canada is not legislation for free alcohol, which Canada has had for so many years, but a process of manufacture that will materially reduce the price of both grain and wood alcohol. That question is engaging the attention of the inland-revenue department, and Minister Templeman states that if a safe denaturing agent less expensive than wood alcohol can be procured, the price of alcohol thus treated will be very materially reduced.

AUTOMOBILE INDUSTRY IN SPAIN.

Consul-General Ridgely, of Barcelona, writes that the only automobiles, with a few exceptions, in use in Spain are of French or Spanish make. A few Oldsmobile runabouts from the United States, and perhaps a half dozen German machines, have found their way into the country, but all the others are French or Spanish.

There is only one automobile manufactory in Spain, but that is a good one, and is rapidly taking possession of the Spanish market. It is the Compañía Hispano-Suiza, of Barcelona, and its factory is in Barcelona. The chief engineer and the man who founded the company is a Swiss. Less than three years ago he succeeded in getting the necessary capital for establishing the business, and the enterprise was successful from the beginning. Last year, besides spending large sums in enlarging the works and in all sorts of betterments, the company paid its stockholders 11 per cent. net dividend. This Spanish company is undoubtedly making first-class automobiles. Until this year it turned out only 14 to 18 horsepower and 20 to 24 horsepower machines. This year, however, it has begun to make 40-horsepower cars, and has delivered five or six of these machines within the past month. The secret of its quick success perhaps lies in the fact that it builds its machines with an eye to their use on the bad roads of Spain. Certainly in no well-known country of Europe are the roads generally so bad as they are in Spain.

Some of the French makers, notably Berliet of Lyons, appreciating these conditions, have built high-swung automobiles specially for Spain, and as a consequence the Berliet machines in particular are more seen here than those of any other foreign make. As yet there is no very general demand for automobiles in Spain; there is, however, a good demand for machines of high class of from 20 to 40 horsepower, and it is clear that this demand will grow steadily. Whether or not cheap machines of 8 or 10 horsepower will ever be popular here is problematical, and the introduction of cheap machines is going to be considerably hampered by the new tariff, which has almost doubled the customs duties. Until the Hispano-Suiza began to manufacture here this duty was about \$190 on a four-seated car, but the new company, claiming protection as an infant industry, succeeded in getting the rate nearly doubled in the tariff which went into effect on the first day of last month.

It may be stated that in view of the Spanish and French hold upon the market, and of the high rate of duties recently established, there does not appear to be much of a field in Spain for American automobiles at this time. If any of our light and cheap cars could be successfully introduced, I am inclined to think those of the buckboard sort would be very suitable if really so sturdy and simple and small of consumption of fuel as they are reported to be and if some of our manufacturers would be a little daring and send some of the buckboards to Barcelona in the hands of intelligent salesmen.

The customs duties are assessed on the weight. The maximum rates are as follows: Any open auto car of any sort would pay 1 peseta (19.3 cents) per kilogram (2.20 pounds) and in addition 200 pesetas (\$38.60) on the coach work. Thus a car weighing, say, 2,200 pounds (1,000 kilos) would pay, if an open car, 1,000 pesetas (\$193) on the weight and \$39 on the body, or \$232 in all; if it were a closed car it would pay 320 pesetas (\$62) on the case, or \$246 in all.

When a car weighs more than 1,000 kilos, the duty on the weight is 20 per cent. higher, or 1.20 pesetas (24 cents) the kilo, instead of 1 peseta, the price for the coach work being always the same—i.e., 200 pesetas (\$39) for open cars and 320 pesetas (\$62) for closed cars.

It may be stated that the price of the Hispano-Suiza 20-24 chassis, in Barcelona, is 17,400 pesetas (\$3,358); the price of the 40-horsepower chassis is 24,400 pesetas (\$4,709). Any sort of a simple open coach work here would cost at the very least \$600.

LETTERS INTERESTING AND INSTRUCTIVE

A Problem in Ignition Timing.

Editor THE AUTOMOBILE:

[396.]—In the "Catechism of the Gasoline Automobile," by Mr. Jones, in your issue for August 23d, he says: "When the rotor of the timer in a four-cylinder, four-stroke cycle engine has lost a quarter of a revolution, it is in position to run well if the spark-control lever is placed farther in the retard position than usual." Supposing the charge is compressed in cylinder one, the timer being a quarter of a revolution behind would be in contact for cylinder three, which is at the bottom of the power stroke. Even if the spark is retarded the rotor is making contact for cylinder four, which is on the exhaust stroke. Please explain this.

GEORGE REED.

Pittsburg, Pa.

The explanation lies in the fact that your reasoning is faulty. If the rotor were to stay in place, the engine at the same time standing still, and the contact operated by the spark lever were moved around the rotor, it is obvious that the different cylinders all would be brought into action progressively. But if the rotor is moved, and then the spark is shifted correspondingly, no *relative* change is produced, and consequently the cylinders fire in their normal order. Therefore, taking the case as you state it, should the rotor alone slip back a quarter of a revolution on its shaft, it is true that contact would be thereby made for the next cylinder after the one that should work. The point is, however, that if the lever be manipulated also, the point of contact goes back to the cylinder which should fire. Incidentally, both Mr. Jones and yourself will find that it will take *advance* of the spark to compensate for the lag of the rotor.

Substituting Ball Bearings for Plain Bearings.

Editor THE AUTOMOBILE:

[397.]—Is it practicable for me to refit an old car, which has plain bearings, with ball bearings of the annular type? I hear such excellent reports of these bearings, and see so much of the good service that they render, that I am very much disposed to equip my car with them in the place of plain bearings, which wear out rapidly and require frequent renewal.

WM. S. WALLACE.

Bonanza, Idaho.

The policy of the change all depends on conditions—the make of your car, the amount of money you are willing to expend to make the changes, etc. To fit a ball bearing of the annular type it ordinarily is necessary to turn cylindrical seats on the shafts and in the housings, so that the bearings go in place with a light driving or a close sliding fit. If there is room to turn these seats large enough for bearings ample to carry the loads, the change should be easy, but do not make the mistake of using ball bearings that are too small, since success with them is absolutely contingent on their being of ample proportions. Good plain bearings, properly cared for, will not give as much trouble as you seem to have had.

Cooling by Ejector Action of the Exhaust.

Editor THE AUTOMOBILE:

[398.]—I would like to know if it is practicable to use the blast of the exhaust gases as a means of cooling the cylinders of an air-cooled engine. I understand that at least one small air-cooled automobile utilizes the exhaust thus directed against the flanges on the cylinder, with a result that I am told is very satisfactory. Is it possible for the exhaust gases applied in this way to carry with them enough of an air current to neutralize their heating effect?

T. M. WOODY.

Salem, Ohio.

With proper design, the system you describe is a very satisfactory one. The exhaust-gas blast can be made to induce an air current of, say, possibly eight times its own volume, in which way a very marked cooling effect is brought about. Better, however, than directing the combined gases directly upon the cylinder, is the plan of utilizing an induced current drawn over instead of forced over the cylinder.

Regarding the Strength of Materials.

Editor THE AUTOMOBILE:

[399.]—What is the maximum strength it is possible to obtain with any quality of material, disregarding expense? Is there anything stronger than the best grades of steel?

R. M. TURNBULL.

Los Gatos, Cal.

Your question is a very vague one, since the term strength does not exclude a number of factors relating to the conditions under which the strength is expected to be exhibited. Thus the strength of material may be that it opposes to tensile stresses, that to compressive stresses, that to torsional stresses, that to bending stresses, etc. The finest grades of alloy steel are far stronger than any other material known. Ordinary alloy steels run as high as 250,000 pounds tensile strength to the square inch, with an elastic limit (limit of stress that can be withstood without permanent deformation) nearly as high. Krupps market more or less of a special quality of steel which they guarantee to show an elastic limit of 350,000 pounds to the square inch, with an elastic limit practically as great as the ultimate strength. This steel has been used for the rear springs of the racing cars of a prominent German automobile concern, and is understood to contain tungsten as one of its components. Probably this steel represents the practical limit that has been attained. It was recently stated, however, by a well-known expert on steels, that it would not be impossible to produce at least a small test specimen, at great expense, which would withstand as high a stress as 600,000 pounds to the square inch. The cost of such a specimen would be prohibitively high, its torsional and compressive strength would be low, and in other ways the result would be a "stunt" rather than a practical achievement.

Ignition Troubles and Changes.

Editor THE AUTOMOBILE:

[400.]—Will you please tell me why it is that the ignition timing on my car will not stay adjusted? As many as a dozen times I have taken the utmost pains to set it so that the spark occurred exactly at the point marked on the flywheel rim, but each time it has gradually become advanced or retarded away from the correct position. I have tested the commutator carefully, and can find no indication that it shifts its position, nor can I see that any of the other adjustments change. The spark alone simply seems to get out, and that is all I can make of it. If you can give me any clue to the reasons for this baffling difficulty I certainly will appreciate it.

GEORGE W. JUDD.

Union, Mo.

The solution of your problem is very simple. It lies in the fact that there are other factors than the ones you have considered which affect ignition timing. The strength of the current, the adjustment of the vibrator, and variation in the quality of the mixture and in the amount of compression all play their part. Even the variations in the temperature of the cylinder wall, in the amount of burned gases retained, etc., have a marked effect. From these suggestions you will readily understand that it is not possible to adjust the ignition timing so that it will remain correct indefinitely. Occasional readjustment is unavoidable and is not very difficult if it is gone at properly. A little study of your car, after you give up the idea that a perfect adjustment is possible, will end your annoyances on this score.

A Question of Lubrication.

Editor THE AUTOMOBILE:

[401.]—Kindly inform me if you consider crude vaseline a good lubricant for sliding-gear transmission case and also for the bevel-gear case on rear axle. Also, would you consider it harmful to thin same with kerosene to allow it to splash in main bearings of transmission case?

J. D. VAN WAGONER.

New York, N. Y.

Vaseline is considered a good lubricant for ball bearings and light machinery generally, but it would hardly be suitable for such

heavy work as you refer to, although it might be made to serve the purpose. In any case, what would be the advantage, since there are on the market special lubricating oils and greases suitable for every part of every automobile, at a cost scarcely averaging as high as that of vaseline? For sliding-gear transmissions and for bevel-gear drives and differentials comparatively heavy oils or greases are generally preferred, while an admixture of graphite is considered by many very desirable, giving very good results in service.

Detachable Rims.

Editor THE AUTOMOBILE:

[402.]—With the detachable rims that recently have come into prominence, because of their successful use on foreign racing cars, what provision is made for taking care of the lugs and the valve stem? That is, how is the tire kept from creeping in the rim without the ordinary clip, which, it would seem from the constructions that have been illustrated, is not used? And, also, where does the valve stem go? What are the real merits of the detachable-rim construction, and can it be predicted that they are going to come into extensive use?

F. W. WOOD,

Binghamton, N. Y.

Several schemes are employed for overcoming the difficulties you suggest. Lugs are used in most cases, but instead of being fitted with the usual long stem and wing-nut or thimble, have very short stems held by small hexagonal nuts, screwed into place with a socket wrench. The valve stem is similarly shortened, so that it barely projects through the rim, or else there is a special hole or pocket made for it in the fixed wheel rim, which does not come off. There is no question but that the detachable rim, permitting as it does the carrying and immediate fitting of an inflated tire unit ready for use without pumping or other manipulation, has points of merit that are certain to bring it into wide favor. Of course it will be necessary to evolve constructions that are absolutely reliable under all conditions, because the danger of losing a tire would be enough to offset the advantages gained by quick replacement.

Evolution of the Speed of the Automobile.

Editor THE AUTOMOBILE:

[403.]—We are accustomed at the present day to extraordinary speed performances, but I cannot help but think that the achievement of the de Dietrich team in the Ardennes race is so remarkable as to receive special mention entirely apart from the mere idea of an ordinary trade advertisement. The evolution of speed in connection with automobiles during the past ten years has been a remarkable one. Individual performances have from time to time been achieved by various drivers on various makes of cars, but nothing approaching the achievement of the de Dietrich has ever been accomplished in regard to high speed reliability.

The distance of the race was 600 kilometers or about 375 English miles. Duray on his de Dietrich won in 5h. 38m. 39s., at an average speed of 66.440 miles per hour; Rougier finishing third, 11m. 32s. later, at an average speed of 64.252 miles per hour; Gabriel finishing fifth, 2m. 3s. after Rougier, at an average speed of 63.878 miles per hour; Sorel finishing seventh, 12m. 24s. after Gabriel at an average speed of 61.705 miles an hour, the performance of the latter being very fine indeed when it was remembered that this was his first appearance in a continental road race. Taking the average time of the four cars altogether the speed works out at 64.07 miles per hour for the team, the total distance covered by all the cars being 1,500 miles.

When it is remembered that three other cars finished in between these drivers, it will be seen that the average speed accomplished by these seven men was considerably over that which I have mentioned, and as an evidence of the extraordinary reliability to be obtained from a racing car of the present day I think the result a marvelous one, as also is the performance of Wagner, who accomplished the first round of 85.714 kilometers—fifty-three and one-half miles—in the extraordinary time of 45 m. 29 s. Duray in his fourth lap accomplished the distance in 45 m. 59 s., at an average speed of practically seventy miles an hour.

Four years ago, viz., in 1902, the average speed of the winner of the same race was just over fifty-three miles an hour, and yet within that four years such is the increase of speed that it is possible for eleven men to accomplish the distance at a much higher rate of speed, and yet not be able to win the race in 1906.

London, England.

CHARLES JARROTT.

Replies to Queries on Functional Troubles.

Editor THE AUTOMOBILE:

[404.]—I read No. 370 in the issue of August 23, relative to the two-cylinder Long Distance car. This car was gotten out by its makers late in 1903 and was practically their 1903 model. It was designed for a slow speed engine, that is to give 12 horsepower at 600 revolutions per minute, which was supposed to be its normal speed. This is, of course, much below present day practice and would partially account for the small amount of lift. In fact, under these circumstances, the exhaust lift would be ample. However, the inlet should be nearly the same as the exhaust. The valve gear, if I remember rightly, is somewhat peculiar, both valves being operated from a single cam and lever, the lever being forced into a depression in the cam by a spring and the other end operating the inlet valve. It is of course very likely that under these circumstances there has been unequal wear on the cam. As there must be a good deal of play with this form of valve motion, I should advise Mr. Yarns to look up this matter and take all unnecessary play between the inlet valve stem and the cam. This should be done with the cylinder on the compression or first part of the working stroke. The play should then not be much over one-sixty-fourth of an inch. If no means are provided to accomplish this adjustment, it may be done by "drawing" the inlet valve stem or putting a piece on the end of the lever.

I also read No. 369 on overheating, and suggest that Mr. Temple try and ascertain if the trouble can be localized to one cylinder or not. If it can, we can feel reasonably sure that the trouble is not with the ignition timing; also that the circulation is as a whole good and that the trouble is not due to carburation. I should suggest that while running the spark be kept as far advanced as can be done without signs of knocking and that the speed regulation be done from the throttle, the spark being always kept adjusted to the speed and throttle position. There is hardly anything worse than a late spark for overheating an engine. Another thing, look to the play between the inlet valve stem and the cam. This should be done is not doing its proper share of the work and thus too much work is thrown on the other, causing it to overheat. This may be caused by unequal or insufficient valve lift.

To test for localizing trouble, about a minute or so before stopping and with the motor at medium speed, cut off the ignition from one cylinder. This will cool the cylinder down by the passage of the cool gases through it so that when we cut off the ignition entirely there will be no danger of self-ignition in that cylinder. In addition it might be well to remove the spark plug or the exhaust valve before making the test, starting and running on one cylinder.

HAROLD H. BROWN.

Boston, Mass.

A Case of Hoist by Their Own Petard.

Editor THE AUTOMOBILE:

[405.]—Irvine R. Dickey, attorney to the county commissioners, and H. B. Hummelshine, city attorney of Cumberland, Md., were arrested the other afternoon by Officer Henry Fisher on Mechanic street, charged with violating the ordinance regulating the speed of automobiles in the city. Mr. Dickey had just purchased a new automobile and was giving the machine a trial test when he fell into the hands of the officer. Both produced bail for their appearance in the police station this afternoon.

Mr. Hummelshine, as city attorney, drafted the ordinance just passed by the city council in regard to the speed of the "honk wagons" on the streets of Cumberland. The ordinance regulates the speed to six miles an hour and fixes the fines from \$5 to \$100 for each violation. Mr. Hummelshine and Mr. Dickey were the first violators of the new ordinance.

How's this for "A Dose of His Own Medicine"?

W. L. WILSON.

Cumberland, Md.

RUN FOR THE GRAPHIC TROPHY.

Besides the Tourist Trophy event September 27 on the Isle of Man course, the A. C. G. B. I. has decided to run the five miles for the *Graphic* Trophy on the following day. It is an international contest open to touring cars list priced at over £300 and under £1,000, the cars to carry four passengers, including the driver. The trophy was first won at Castlewellan in July, 1903, during the Gordon Bennett week by a Humber car, and only becomes the property of any one person after car, and becomes the property of any one person only after three successive victories. The vehicles competing must be of a recognized tourist type, with mud guards, lamps, silencers, and no car that has competed in a racing car event since 1903 will be eligible.

SEVEN TIED IN FRENCH TOUR.

PARIS, Sept. 3.—For 28 days the competitors in *Le Matin's* long-distance touring contest scampered over the plains, climbed the mountains, or danced about on the ill-paved streets of Old World towns in their endeavor to cover 3,728 miles without a penalty point. They were 48 at the start; at the finish their number was not much over twenty, and of these many had a heavy black list against them. According to their weight and cylinder capacity, the machines had to furnish a daily average of from 25 to 45 kilometers an hour, all adjustments and tire repairs being counted in the running time.

Seven came through without the loss of a single point, among them being three De Dion-Boutons of 8, 12 and 24 horsepower; one Darracq, one Cottureau, one Bayard, and one Mercedes. Being a sevenfold dead heat, the first prize of \$5,000 was divided among all the non-penalized men, each one receiving rather more than \$714.

The motorcycles all dropped out at a very early stage, but the small cars of from 8 to 12 horsepower stuck at it and finished in good positions. As the horsepower increased the proportion of arrivals decreased, which only proves that the average had been placed too high for the big machines.

The Pyrenees, the Alps and the Vosges mountains all had to be tackled, and, though some of the little ones had their hill-climbing powers taxed to the utmost, they got an advantage over the big fellows in the long, winding descents, being able to run down quickly, put on the brakes, to slip around a corner, and be off again in a twinkling. The big ones had to proceed cautiously, take corners gently, and were always in fear of shooting over the edge of the road if they took turns too rapidly. Cobble-paved roads formed a feature of the tour, and as the *Matin* was running this competition largely for its own glory, every ill-paved village which could be included in the run was given a sight of the cars. The big ones put in second speed, throttled down and cursed, whilst their mudguards broke loose and fittings came away from the dash. The small ones danced about as wildly, but they were not losing time in the same proportion and could take matters more philosophically.

Spring wheels took part in the competition, but failed to make a showing. Dismountable rims, on the other hand, did well, none gave any trouble, and the foolish ones, who changed tires in the old way under a scorching southern sun, cursed their stupidity in not keeping up with the times. Compressed air bombs for inflating tires were employed by numbers of competitors, the saving of labor being appreciated after a tiring struggle with a big outer cover.

Engine troubles were not very numerous. Springs frequently proved too weak, brake bands gave way, tire troubles claimed many, and road accidents still more. As a preliminary to the European Circuit, which should take place next year, the *Matin* tour has been exceedingly useful. Those who took part in this run will be better prepared for the A. C. F.'s tour next season.

MERCEDES EXAMPLE NOT CONTAGIOUS.

PARIS, Sept. 5.—Much surprise was caused in Paris by the announcement that Mercedes cars would not in future take part in any road races. C. L. Charley gives it as his opinion that a number of French firms will follow the Mercedes lead in the matter of abstention from racing next season. In Paris there is a feeling that the series of defeats which Mercedes racing machines have suffered during the last two seasons has something to do with their withdrawal. Since the last Gordon Bennett race the fear of Mercedes as a speed rival has passed away from the French mind. A rumor is abroad here that Mors and Motobloc will engage in racing next year.

The Amir of Afghanistan is a most enthusiastic autoist, having had a very handsome car presented to him by the British Mission to Kabul.

GROWTH OF PITTSBURG TRADE.

PITTSBURG, Sept. 10.—Five years ago the automobile business in Pittsburgh was in its infancy. No one dared even predict that the city which is literally built on hills would ever become an automobile center of national importance. The direst predictions were made by the horse interests of Pittsburgh regarding the future of the automobile, and its very best friends had to hide their enthusiasm under a mantle of hopefulness. Two years ago the firms dealing in automobiles in Greater Pittsburgh could have been counted on the fingers of one hand. To-day there are over thirty established firms which are recognized by the trade at large, and which are rapidly building up a clientele which bids fair to soon include the big proportion of the men in Pittsburgh whose incomes are \$2,000 or over.

Nearly one-half of these auto companies have entered the field this year. Throughout the East End they have sprung up like magic, and in Allegheny and the suburbs, as well as the sections close to downtown, new firms have suddenly taken locations and blossomed forth into flourishing agencies. Six or eight of these firms have built handsome and costly garages since last November. Others have leased big livery stables for long periods, remodeled them and equipped them with all modern devices known to the successful garage. The investment for garages alone has run away up into the hundred thousands. Add to this the capital necessary to start in the auto business, and it is safe to say that at least \$1,500,000 has been invested in the business in Greater Pittsburgh this year.

The following list of companies which are now operating in Pittsburgh is interesting for two reasons. It shows the remarkable growth in sales of automobiles, for every one of these firms issues weekly reports of sales actually consummated. It also shows the fierce competition that makes the introduction and sale of a new machine in the Iron City a matter that no novice need try. Experienced automobile men succeed here. Those who are not "up" in the modern details of the business, soon find out it is best for them to sell out.

Pittsburg now has these agencies: The Banker Brothers Company, Standard Automobile Company, Keystone Automobile Company, Hiland Automobile Company, Fort Pitt Automobile Company, Central Automobile Company, East Liberty Automobile Company, Atlas Automobile Company, East End Automobile Company, Logan Auto Company, Auto Repair Company, Auto Tire & Repair Station, Belmar Automobile Company, Homewood Automobile Company, Vestal Shock Absorber Company, Ernest D. Nevin, D. O. Collins, L. G. Martin, W. B. Stark, Winton Motor Carriage Company, Vehicle Storage Company, Simms Automobile Company, Colonial Automobile Company, Price Auto Company, Manchester Automobile & Machine Company, Limited, and the Wilksburg Automobile Company.

BOX SPRINGS HILL CLIMB THANKSGIVING DAY.

LOS ANGELES, CAL., Sept. 6.—The first of the fall events in Southern California will be the annual Box Springs grade hill climb at Riverside, Thanksgiving Day. The grade is being worked over and put in the best of condition for the race. The committee in charge expects many more entries than last year, when but a dozen cars competed. Last Thanksgiving the contest was for stripped machines, but this year each contestant must carry four passengers and a full touring car equipment. It will be strictly for stock cars. Most of the entries will come from Los Angeles, and as the climb is a popular one the entry list will be large.

Automobile races will be a feature of the annual Rutland County Fair, to be held in Rutland, Vt., on September 18, 19, and 20. W. K. Farnsworth, of that city, will be in charge.

1907 MODELS OF THE POPE LINE

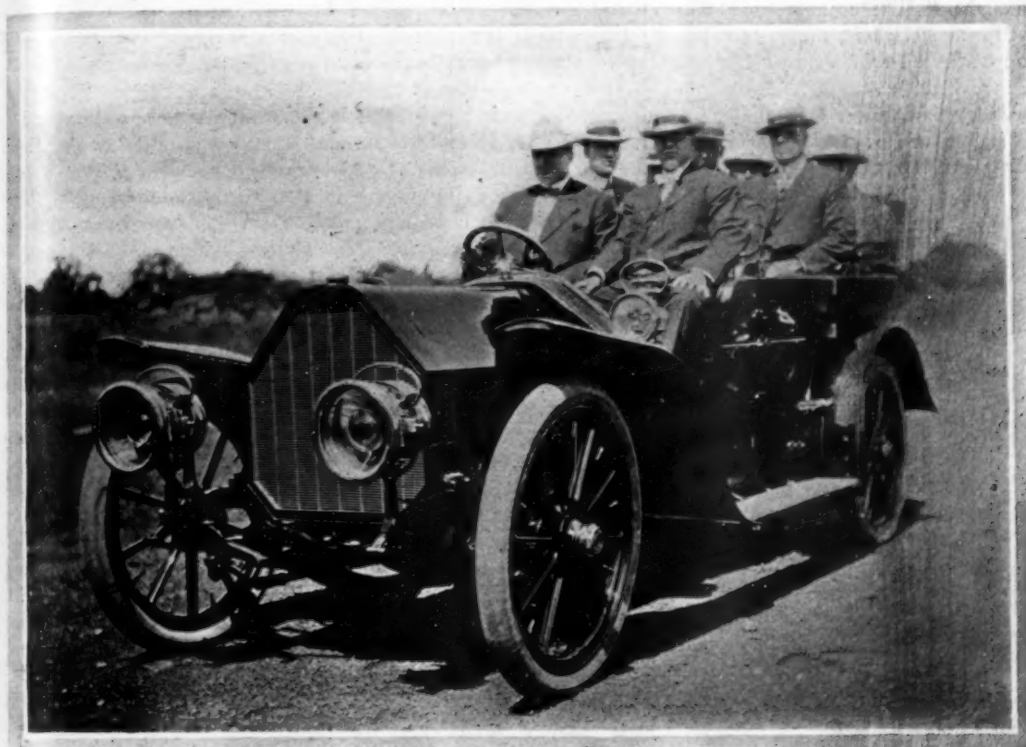
AMONG the manufacturers who believe in getting their 1907 models early before the public are the great Pope concerns, the Pope Motor Car Company, of Toledo, O., builders of the Pope-Toledo machines, and the Pope Manufacturing Company, of Hartford, manufacturers of the Pope-Hartford cars. The new 50-horsepower Pope-Toledo and the new models of the two Pope-Hartfords show a number of interesting features, partic-

fitted with a four-cylinder four-cycle water-cooled motor rated at 50 horsepower, driving through a multiple disk clutch, four-speed sliding gear change speed mechanism of the selective type, countershaft and side chains to the rear wheels mounted on a dead rear axle. Wheels are 36 inches in diameter. Throughout the machine chrome nickel steel is freely used, the material being of a grade having a tensile strength of 225,000

pounds to the square inch. Imported D. W. F. annular ball bearings are fitted throughout the car, including the engine crankshaft, the aggregate reduction of friction being an important factor in the running of the machine, while the space saved by this type of bearing tends to lighten the car to an appreciable extent.

Structural Details.

Copper water jackets, which have long been identified with the Pope-Toledo, are used in the new model. The cylinders are cast in pairs, with the heads integral. The valves, all mechanically operated, are placed in the cylinder heads and are actuated by double-acting rocker arms; a single camshaft carries the cams that serve to move the long vertical push-rods which, in turn, transmit motion to the rocker arms or walking-beams. The chrome nickel

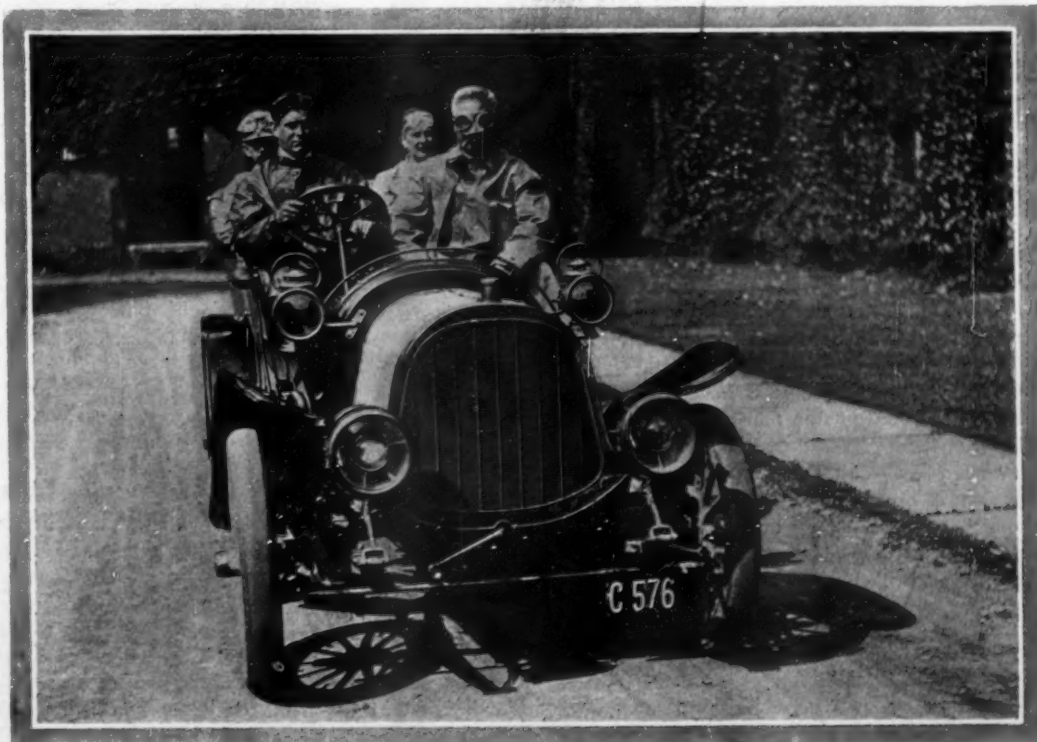


TYPE XV, THE 1907 POPE-TOLEDO CAR WITH 50-H.P. MOTOR.

ularly the big car from Toledo, with its ball-bearing crankshaft and free use of expensive modern steel. The Pope-Hartfords, of 18 horsepower and 30 horsepower, complete a line of cars that must appeal to a very wide range of purchasers.

The Pope-Toledo for 1907 a Big Machine.

In announcing the new model Pope-Toledo car for 1907 the manufacturers state that extraordinary efforts are being made to produce a car of the highest possible quality, and that, owing to the large amount of work and the extreme care necessitated by this high-class work, only 500 machines can be turned out, notwithstanding the great capacity of the works. Type XV is the designation of the new model; the car will be



MODEL L, THE LARGER OF THE 1907 POPE-HARTFORD MODELS.

steel crankshaft runs in three ball bearings of large size. Gears for rotating the camshaft are encased and run in oil. Cooling water is circulated by a gear-driven centrifugal pump through a radiator having a water capacity of 4 1-2 gallons. Ignition is by jump spark, the current being generated by a gear-driven high-tension magneto, while a storage battery is installed also.

Directly under the footboard and easily reached is the transmission mechanism. Through a multiple disk clutch the power of the engine is transmitted to the four-speed selective change-speed gear, with its shafts running on ball bearings. The component parts of the change-speed gear are made of billets of chrome nickel steel of the high tensile strength already referred to; the gears have teeth of six pitch. The countershaft, also running in ball bearings, is driven by bevel gears, the drive being enclosed in a rearward extension of the oil-tight gearcase. Final drive is by side chains and large sprockets.

Cold-pressed steel, of a special alloy, is employed for the channel section framing; the main frames are of deep section and are beaded over. There are four cross-members. The motor



MAKING AN AXLE FOR THE BIG NEW POPE-TOLEDO.

is so attached to the frame that, when the radiator is removed, it can be slipped forward and removed from the car in ten minutes without disturbing other parts of the machine.

Axles, both front and rear, are of I-beam section, the rear axle being, of course, of the stationary type. The wood wheels, both front and rear, turn on ball bearings. The ball bearing idea is carried even to the steering knuckles, the pivots of which are mounted in ball bearings of the same type as used throughout the car. The 36-inch wood wheels have 10 and 12 spokes front and rear, respectively. Front tires are 3 1-2 inches and rear tires 4 inches. Tread 54 inches, and wheelbase 115 inches. Steering gear is of the worm and segment type, irreversible, and is adjustable and mounted on ball bearings; all the working parts are enclosed in a dustproof casing. The column, of large diameter, is rigidly supported and carries a handsome steering wheel made with an aluminum spider and a grip circle of Circassian walnut.

Brakes are double acting, equalized, and are readily adjusted by hand. The foot brake is on the countershaft and the emergency brakes are on the rear wheel hubs.

Seven passengers can be comfortably carried in the steel side-entrance body. The hood and mudguards are of sheet aluminum; the guards are of ample width so as to afford protection from flying dust and mud. The price of the car is \$4,250.

A very attractive car of the high-powered runabout type is made by slightly shortening the wheelbase of the Type XV chassis and putting on a two-passenger body, with the seats well up toward the front and a few details altered.

Two Pope-Hartford Models for 1907.

There will be two Pope-Hartford models for 1907, designated Model L and Model G. Model L is a four-cylinder car with a

vertical motor rated at 25-30 horsepower, driving through cone clutch, three-speed sliding gear transmission and propeller shaft to the live rear axle; Model G is a smaller car, having a double-opposed cylinder motor rated at 18 horsepower, driving through a three-speed sliding gear and propeller shaft. The four-cylinder car costs \$2,750 and the smaller machine \$1,600.

Model L, the four-cylinder car, has the cylinders of its motor cast in pairs with the heads and water jackets integral. The mechanically-operated valves are placed in the heads of the cylinders, all being of the same size and interchangeable, and all operated by long push-rods from a single camshaft. The crankshaft is of nickel steel, with long bearings, and can be reached through hand holes provided for the purpose in the crankcase. Ignition is by jump spark, with current supplied by a dry battery and a storage battery; provision is made for a magneto.

The cone clutch is of large diameter, of aluminum with leather facing. The transmission gives three forward speeds and a reverse and is enclosed in an aluminum case hung directly under the footboards. Final drive is by propeller shaft.

Lubrication of the motor is effected by a mechanical oiler placed under the hood and driven from the water-pump driving shaft by a belt; sight feeds are placed on the dash. Transmission and rear axle parts are lubricated by oil placed in their casings, and all other frictional parts are fitted with oil cups or grease cups of the compression type.

Special steel of I-beam section, forged in a single piece, is employed for the front axle. In the rear axle the live shafts are of solid steel running on ball bearings; the inner ends of the shafts are squared for the differential gears and the wheels are keyed to the outer ends and locked securely in place.

Armored wood is used for the main frames, seasoned ash being flitched with heavy steel plates. The engine is carried on a channel steel sub-frame bolted to steel cross-members.

Steering gear is of the worm and sector type, irreversible, and is enclosed in a tight casing. The connections are provided with spring buffers. There are two brakes, acting on drums on the propeller shaft and on the hubs of the rear wheels.

The body is large and roomy and has the usual side entrances. The hood has large doors opening in both sides to give access to the engine; mudguards are wide and flaring, the front guards extending to the frame of the car, so that flying dirt cannot pass between the guards and the body. The dash is of curved sheet steel with mahogany front and rear sheathing, and is surmounted by a brass rail. The wheelbase is 102 inches, tread 56 inches, and the wheels 32 inches in diameter, front and rear, with 4-inch tires, and run on ball bearings.

Pope-Hartford Model G, 18-horsepower Touring Car.

Though rated at 18 horsepower, the opposed cylinder motor of Model G will, the manufacturers state, develop from 20 to 22 horsepower on the brake. The inlet valves of this motor are of the automatic type. Ignition is by jump spark, the current being supplied by two sets of dry cells placed under the front seat of the car. A mechanical oiler on the dash, driven by belt from the camshaft, pumps oil to the main bearings and the cylinders, while the three-speed sliding gear transmission is, in the usual way, oiled by the lubricant placed in its casing, as is also the rear axle and its moving parts. The carbureter is of the float feed type; the controlling levers are placed over the steering wheel and the gears are changed by a single progressive lever at the side of the car. The front axle is a solid forging, and the steering yokes are forgings of ample strength. The live shafts of the rear axle run in ball bearings in the sleeve or casing. Brakes are placed on the propeller shaft and on the hubs.

Like the larger car, the Model G has a frame of ash and steel, with a steel sub-frame for the support of the engine. Five passengers can be carried in the side-entrance body. The wheelbase is 88 inches and the tread 56 inches. Wheels are 30 inches in diameter, front and rear, with 3 1-2-inch tires, and run on ball bearings. The gasoline capacity is 11 1-2 gallons.

AUTO CLUB DOINGS IN THE EARLY FALL

Tacoma A. C. Will Attend Agricultural Fair by Invitation.

TACOMA, WASH., Sept. 7.—The Tacoma Automobile Club is probably the first in the country to receive a hearty invitation from an organization that consists largely of farmers. The club received this invitation from the Puyallup Valley Fair Association, asking the club to designate and attend in a body automobile day at the fair to be held the first week in October. The club was nearly taken off its feet by this invitation. The invitation was further strengthened by a promise to improve the road between the two points. The distance is twelve miles. Puyallup lies in one of the most fertile districts in the world, the berry and hop crops there being unexcelled in quality and quantity. As the club is desirous of cementing friendship with the granger element of the county, it goes without saying that the invitation was accepted, and Saturday, October 6, was designated as automobile day.

The club at the same meeting decided to levy an assessment of \$5 on each member for the purpose of keeping in good condition the road between here and South Tacoma. A vigorous membership campaign is also to be instituted, as there are now quite a number of car owners that are not members.

An effort will be made to improve certain conditions about the city. Attention was called to the fact that the rounded tops of manholes are proving detrimental to the paving. Heavy vehicles in passing over manholes thus topped come down on the other side with a thud, thus breaking up the paving. Naturally this also forms a bump that is felt in autos. The secretary of the club was instructed to call the attention of the Commissioner of Public Works to the condition and urge the adoption of flat tops.

Worcester A. C. Gymkhana Will Be Held September 22.

WORCESTER, MASS., Sept. 10.—Last year the gymkhana and field day of the Worcester Automobile Club proved such a pronounced success that the club has decided on its second annual event of this character, and has set Saturday, September 22, as the date and Worcester Oval as the place. A program, consisting of driving at rings, relay race for touring cars, turning, obstacle race, balancing, ball and tub race, forward and back, stopping, puncture contest, and a twelve-miles-an-hour race, has been arranged by the committee in charge. A handsome silver cup will be given to the contestant not connected with any branch of the automobile industry scoring the largest number of points. A silver cup will also be given to the automobile station or factory scoring the largest number of points. To the lady contestant scoring the largest number of points a silver cup will be given, and first, second, and third-ribbon prizes will be given in each event. Out-of-town clubs have been invited to participate in the parade, and in this event a silver cup will be given to the best decorated car. The club will keep open house at its headquarters, 44 Front street, during the day.

A. C. of California's First Endurance Run, Sept. 14.

SAN FRANCISCO, CAL., Sept. 6.—An automobile reliability test, the first ever held in this section of the state, has been announced for Friday, September 14, by the Automobile Club of California, and the entry list is open to club members only. The destination of the tour is Del Monte, a distance from this city of about 140 miles, which makes it a good day's run. On the day following the run the automobilists will enjoy gymkhana games at the Del Monte track.

Milwaukee Automobile Club's Second Annual Orphans' Day.

MILWAUKEE, WIS., Sept. 7.—The second annual orphans' day parade and picnic under the auspices of the Milwaukee Automobile Club was held Thursday afternoon, and 250 little representatives of the Protestant and St. Rose's orphan asylums enjoyed a day's outing which they will long remember. Decorated with scarlet and white ribbons and with American flags, forty-five machines lined up on North and Prospect avenues at 9 o'clock in the morning to call for the inmates of the two orphanages. With six or seven piled in each auto, and all carrying flags and chattering with delight, the procession started gaily down Prospect avenue, and followed a roundabout course until Washington Park was reached, when the youngsters made a mad rush for the Zoo and playgrounds. The happy throng was given an opportunity to take advantage of the new apparatus installed in the park, which is calculated to provide wholesome enjoyment for Milwaukee's rising generations whose parents are not in a position to supply a varied program of amusement in their own homes. The Zoo, too, was altogether new, and enabled the children whose lives are spent in the confines of charitable institutions to see for the first time real live animals, about which they had read in story books.

After romping across the greens, and indulging in various sports, it was with merry shouts that luncheon time was hailed. The spectacle presented when the blue-robed sisters ushered the little girls of St. Rose's asylum to their places was unusually impressive. The little ones of the Protestant asylum were seated only a short distance away, and were taken care of by the matron of the institution, Miss Mary L. Atwood.

Late in the afternoon, after the children had been royally entertained, they were summoned together and piled into the automobiles and taken to their institutions. Everyone connected with the undertaking tried to outdo the other in making it a red-letter day for their guests. Among the members of the automobile club who spent the entire day in an attempt to make the picnic more than an ordinary success were James T. Drought, secretary of the club; J. E. Farber, Dr. R. J. Healy, and Christian Scholtka.

Not being satisfied to lend their machines for the enjoyment of the little orphans, the Milwaukee Automobile Club will take the inmates of the Protestant Home for the Aged for an outing on September 20.

Tennessee's Leading Club Elects New Officers.

NASHVILLE, TENN., Sept. 10.—Much enthusiasm was evidenced at the annual meeting of the Nashville Automobile Club in favor of the proposed country club house and other measures favored by the organization, and the new board of officers will find plenty of official duty to occupy its attention during its term of office. The election for officers resulted as follows: President, Samuel G. Douglas; vice-president, F. O. Watts; secretary, J. C. Symmes; treasurer, W. P. Bruce; directors, the previously named officers and Duncan R. Dorris, E. C. Andrews, T. J. Tyne, George M. Ingram, and C. C. Coddington. Fourteen new members were admitted.

The matter of selecting a site for the new country club house was referred to the newly elected board of directors, which will confer with the company that is now making improvements at Belle Meade, with the view of interesting that corporation to the extent of building a club house at that point and renting it to the club for a term of years.

It was decided to adopt a schedule of weekly club runs for the balance of the season and to have the board of directors confer with the officers of the State Fair with a view of running some automobile races at the time the fair is held.

Rhode Island A. C. Will Fight the Warwick Arrests.

PROVIDENCE, R. I., Sept. 10.—At its last meeting the Rhode Island Automobile Club decided by a unanimous vote to fight the action of the town and city councils in assuming to regulate the speed of automobiles, and declared its purpose to take the matter up to the Supreme Court. About fifty members and persons with grievances, particularly against the town officials of Warwick, attended the meeting. President William Penn Mather made a short address and was followed by Col. Frank W. Tillinghast, counsel for the club, who explained the situation in Warwick, where two automobilists, one a Boston man, were arrested Sunday and held, in default of bail, until Monday morning. Bonds were ready, but no official authorized to accept them could be found. Resolutions were adopted to-night as follows:

"Resolved, That a committee of three be appointed with power to take charge of such criminal cases brought or pending against members of the club in the town of Warwick as may appear to said committee to be unjust persecution and which said defendants may permit said committee to take charge of. Be it further

"Resolved, That said committee be authorized to employ counsel and take such legal proceedings in the premises as they may decide proper.

"Resolved, That a sum be appropriated for the use of said committee in employing counsel and paying legal expenses."

The committee consists of William Penn Mather, Col. Frank W. Tillinghast and Prescott C. Knight.

A. C. of Pittsburg Will Conduct Run to Cambridge Springs.

PITTSBURGH, PA., Sept. 10.—Agitation in favor of a big automobile run from Pittsburgh to Cambridge Springs, Pa., which was started one month ago by the Automobile Dealers' Association of this city, has resulted in that organization withdrawing its hand at managing the affair in favor of the Automobile Club of Pittsburgh. The following committee has been named from the automobile club to manage the run: W. W. Darley, E. J. Kent, W. L. Dickson, Edward Kneeland, G. E. Turner and W. C. Temple. It is proposed to hold the run September 15 if the weather is propitious and the necessary arrangements can be perfected. Besides the 100 or more cars which are likely to start from Pittsburgh, it is planned to have at least 500 cars from Cleveland and Buffalo make the run the same day, making a big gathering of automobilists at Cambridge Springs from the three cities. If this succeeds there will likely be some lively discussions on road questions which may lead to helpful legislation next winter.

Kansas Division of American Motor League Organized.

TOPEKA, KAN., Sept. 8.—A state division of the American Motor League was formed here on Labor Day, the occasion being automobile day at the State Fair, under the auspices of the Topeka Automobile Club, which acted as host to the visiting automobilists. A. E. Agrelus, of Lindsborg, was elected chief consul of the newly-formed body, which has about one hundred members, and George W. Crane, of Topeka, was elected secretary-treasurer. The legislative committee consists of Arthur Capper, D. H. Martin and E. D. Osborn.

In the afternoon a series of gymkhana events were run off at the fair grounds race track. In the evening the Topeka Automobile Club entertained visitors with a dinner at the Elks' Club.

Minneapolis A. C. Will Hold Bi-monthly Matinee Races.

MINNEAPOLIS, MINN., Sept. 8.—The matinee driving committee of the Minneapolis Automobile Club has arranged for five bi-monthly race meets on the state fair grounds track. All club members are eligible for free entry, and no admission will be charged the public. Chairman Colburn, of the committee, is in a receptive mood for challenges, it being the intent of the committee to run match races only.

Pennsylvania Federation to Tour State Officials.

YORK, PA., Sept. 10.—York's progressive Automobile Association is in receipt of a letter from the Pennsylvania Motor Federation, with headquarters in Pittsburg, in which the local association is invited to take part in the tour of inspection over the proposed state automobile road from Philadelphia to Pittsburg. The federation hopes to interest the members of the state legislature, and with that end in view will take a score or more of the state officials over the route and outline the proposed improvements. According to the plans, the party will leave Philadelphia September 20 and proceed by way of Coatesville, Lancaster, Columbia, Wrightsville, York, and Gettysburg, and thence westward to Pittsburg. A stop over will be made in this city and the visitors will be entertained by the local association. The federation, aside from wanting the road improved, has planned to show the state officials that ten miles an hour is not enough for a speed limit.

Arrangements have been made by the directors of the York County Fair to have a separate place provided for automobiles. This is a result of the action taken by the York Automobile Association. A space several acres in extent will be fenced off and special officers placed in charge.

CLUB DOINGS IN GENERAL.

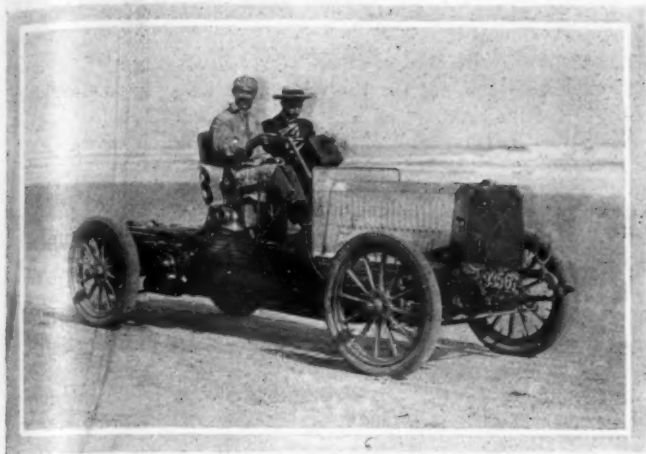
MONMOUTH, ILL.—President Brown, of the Monmouth Automobile Club, has been in Chicago to confer with Secretary Gorham, of the A. A. A., in reference to the club becoming affiliated with that organization through membership in the state body. The matter will be officially considered at the next meeting.

JACKSONVILLE, FLA.—The Jacksonville Automobile and Motor Club has decided on September 17 as Orphans' Day, and will also include in the run, besides the orphans, the inmates of Home for Aged and the Confederate Veterans. An elaborate lunch will be provided at Riverside Park. Forty automobiles have already been offered for the day.

JOPLIN, MO.—Automobilists of this city and vicinity have organized temporarily with the following officers: President, J. F. Dunwoody; secretary, F. C. Ralston; treasurer, W. G. Sergeant. A committee, consisting of H. G. Packer, A. C. Webb and Dr. C. A. Morsman, was appointed to draft a constitution and by-laws, and report to the president upon the completion of the work, when a call will be issued to perfect a permanent organization, with a name to be selected at that time.

BINGHAMTON, N. Y.—The annual meeting of the Binghamton Automobile Club was held last week at the Country Club, and the following officers were elected for the ensuing year: President, J. M. Davidge; vice-president, W. G. Faatz; secretary, Norman M. Pierce; treasurer, Dean Albert Smith; directors, the previously named officers and B. B. McFadden, Merritt J. Corbett, Charles E. Tichener, Frederick E. Barnes, S. B. Davidge, S. M. Frechie and Charles F. Sisson, Jr. Standing committees were appointed with the following chairmen: Legislative, Norman M. Pierce; entertainment, B. B. McFadden; contest, C. F. Sisson, Jr.; highway, C. E. Tichener; membership, S. M. Frechie.

LOS ANGELES, CAL.—The Automobile Club of Southern California is pushing its work of posting signs on all the principal Southern California roads, and before the winter is over every highway of any importance will be marked for 75 miles in all directions with the enameled tin signs of the club. Work on the road between Los Angeles and Riverside and San Bernardino is practically completed, and signs will now be placed on the roads leading to the beaches and the much-traveled highway between this city and Santa Barbara. The membership of the club is steadily growing, and should reach the 500 mark before many months elapse.



COOPER'S BROAD SMILE AFTER HIS :50 1-5 MATHESON MILE.

TOM COOPER'S SAND MILE.

ATLANTIC CITY, Sept. 6.—Tom Cooper and his 50-horsepower Matheson stripped touring car was the remarkable feature of the final afternoon of the successful three-day meet of the Atlantic City Automobile Club. The Matheson pilot asked for and was given an opportunity of trying a straightaway mile with seven passengers aboard. Over the sands he flew to the tune of 50 1-5 seconds, which was five seconds better than H. N. Harding's English Daimler mile that followed later. The Daimler only carried the driver and mechanic, but did not discard the tonneau.

Because of the victory of the Matheson in the match race of the previous day, there had come an offer from the foreign car contingent of a \$500 wager in a time trial match. President Charles A. Singer, of the Matheson company, was content to stand pat on the result of the race, and furthermore says he does not believe very much in betting, though he could supply a substantial sum if he felt so inclined. Therefore it had been hardly expected that the Matheson and Daimler would go against the watch, but when Cooper asked the opportunity a similar request came from Harding. Naturally the followers of the American car expressed more or less jubilation at the outcome.

The fastest mile of the entire meet also came on the third afternoon, the Vanderbilt Darracq of S. B. Stevens, with Campbell at the wheel, flying over the beach in :37 4-5, C. A. Schroeder's Darracq covering the distance in :38 1-5. The Stevens Darracq defeated its rival in the heavyweight class, and again in the match race.

In both of the handicaps Tom Cooper was second with the Matheson. D. Walter Harper's Stanley steamer took one event through its ability to get away quickly, and the 40-horsepower Winton of John N. Wilkins, Jr., appropriated the other handicap with a 25 seconds allowance. Harper's steamer also defeated three other Stanley steamers, and W. T. Smith's 50-horsepower Thomas defeated S. M. Moore's 30-horsepower Franklin in a special match. R. Crawford, driving a Crawford car, covered the mile in 1:03 3-5.

STATISTICS OF BRITAIN'S AUTOMOBILE TRADE.

U. S. Consul Frank W. Mahin, of Nottingham, England, reports great activity in the extension of electric motor lines in Great Britain. Referring particularly to the automobile industry, he reports it in a very flourishing condition from the very large demand this year, and states that the factories in various parts of this country, so far as heard from, are planning or actively engaged upon extensions. The British industry now uses some \$30,000,000 capital and employs about 20,000 hands. The present demand is unprecedented. In the first seven months of this year over 3,000 foreign automobiles were imported, costing over \$5,000,000 and also \$5,000,000 worth of parts of machines.

MAIL CARRIERS MUST BUY THEIR AUTOS.

WASHINGTON, D. C., Sept. 10.—Great annoyance has been caused the officials of the Post Office Department by the published announcement that in the event the trials with an Orient buckboard in the rural free delivery service prove successful, the department would supply them as fast as possible to all carriers. Readers of THE AUTOMOBILE will remember that several months ago the Waltham Manufacturing Company secured the permission of the Post Office Department to "try out" an Orient buckboard on three rural routes adjacent to Washington. These trials were eminently successful, the representative of the department who participated in the trials making a very flattering report about the performances of the little car, which was sent broadcast over the country by the press associations and the automobile press. Closely following this the impression got abroad that the department intended to buy cars by the wholesale and furnish them to rural carriers. Of course, this is far from the truth, and, with a view to killing this impression, Fourth Assistant Postmaster DeGraw has issued the following announcement:

"While the department will permit rural carriers to use automobiles in serving their routes in those sections where the topography of the country and the character and condition of the roads render their use practicable at all seasons of the year, yet the department does not intend to furnish automobiles to rural carriers. Carriers who desire to use automobiles must provide them at their own expense."

Columbus, O., Wants to Collect Mail by Autos.

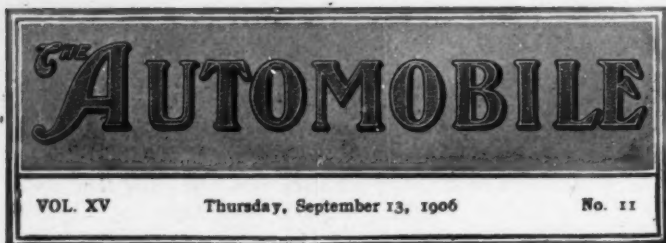
COLUMBUS, O., Sept. 10.—Postmaster Harry Krumm, of this city, has come out in favor of the use of automobiles for the collection of mail. He said it would be an ideal method and that it would increase the efficiency of the service more than any other he knew of. "I would be delighted to use automobiles for this purpose," said he. "Whenever they arrive at such a point of efficiency that they can be depended upon to a degree of comparative certainty, there is no doubt they will be put into general use by the government."

HENRY B. JOY AS A MOTOR BOATIST.

Henry B. Joy, general manager of the Packard Motor Car Company, has taken to the water, and the accompanying picture will show him at the wheel of the *Geisha*, his new motor boat, which has done some excellent speeding on Lake St. Clair. A 24-horsepower Packard motor is contained in the hull, which was built by Godshalk of Philadelphia. Several Packard motors have been installed in boats, with gratifying results. The *Geisha* has shown a speed of 19.3 miles per hour; its length over all is 32 feet, and its beam 5 feet.



SPEEDING THE "GEISHA" WITH 24-H.P. PACKARD MOTOR.



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Just a Word to Vanderbilt Course Visitors.

When a privilege has been granted it should not be abused. This is common sense. The legislature of the state of New York gave to the boards of supervisors of the various counties permission to set aside on specified dates county roads for automobile speed contests. The board of supervisors of Nassau county legally granted permission for the running of an American Elimination Trial, September 22, and for the Vanderbilt Cup Race, October 6.

But no permission has been nor could be granted for indiscriminate speeding over the Vanderbilt course by the thousands of non-contesting automobiles which will visit Long Island previous to the American event, and between it and the international contest.

True it is that some of the residents of Nassau county will profit by the presence of the automobile army, but many others will be put to considerable inconvenience and be subjected to interference with habits of long standing. Not a few Long Island residents have said that the contestants themselves were of lesser trouble than the invaders who itch for the opportunity of trying their cars over the circuit at racing speed. These are the ones who must hold themselves in check, and if they cannot resist the temptation which all autoists will naturally feel when on a race course, they will have only themselves to blame if the drastic net which the Vanderbilt Commission has been compelled to set catches them in its meshes.

All autoists who want to see the great races of September 22 and October 6 should lend their aid to Chairman Thompson and his associates in subduing the unruly ones whose actions might imperil the permissions already granted. There are other unfre-

quented country roads where fairly fast going is possible, but the Vanderbilt course is one on which all sensible and considerate drivers will exercise caution of the most painstaking kind. Those who cannot or will not see the wisdom in being good should be made to see the light.



Automobile Traveling and Railroad Transportation. The railroads are not yet positive as to whether the automobile is beneficial or harmful to transportation interest on steel rails. It would seem, however, that whatever the railroad loses in tourist travel through preference for the automobile, the motor-driven vehicle, acting as a feeder, supplies many more passengers than it takes away.

But as to the greater pleasure of automobile travel when the highways are what they ought to be, there can hardly be any question. During his summer European trip Chairman Thompson, of the A. A. A. Racing Board, never set foot on a railroad train, and his automobile carried him several thousand miles. Col. S. P. Colt, a well-known American now abroad, was quoted in this vein just before sailing for home: "My only regret is that I cannot drive my automobile across the ocean. I have not been in any kind of conveyance save an automobile since I landed in Europe."

The same kind of a story has been told by other Americans, and some day when our roads have become real highways, with some degree of continuity, the Europeans who visit our wonderful country will employ the automobile in their touring. There might be such a thing as railroad interests interfering somewhat with the highway improvement plans that are prevalent in many states. At least those interested in road reform might keep an occasional eye on the attitude of the railroads, which Mr. Bryan thinks should be owned by the government.



Engineering Value of Road Racing.

The engineering importance of road racing has apparently come to be more generally recognized by the public, at least if one may judge by the greater sanity of the views expressed on the subject. Not so long ago it was a widespread belief that the road race was a sort of public rough-riding contest, in which the road user was inconvenienced merely for the amusement of the spectators. Its value to the industry as a qualitative test of efficiency and reliability of competing machines, and that with the full sanction of the law, was quite overlooked.

The persistence of the French type of machine, which has been developed very largely by road racing, has made a serious impression on those who have given the subject any thought, and it is repugnant to the American temperament that the French designer should assume a leading position, especially when that position is the outcome of an experience that is ours if we shall only avail ourselves of it. The coming elimination trials and Vanderbilt race on Long Island provide means for acquiring that experience which many of our most progressive builders have availed of.

The striking contrast in the machine of to-day and that of only four years ago is well shown by the results of the recent Ardennes race. In this speed contest one team of four machines finished the race after covering the course of 375 miles at rates of speed varying from 66.440 miles an hour for the fastest, to 61.705 miles an hour for the slowest. The aggregate mileage of these cars was no less than 1,500 miles, which were covered at an average rate of speed a fraction in excess of 64 miles an hour. Four years ago the winning car averaged only 53 miles an hour; in the present race eleven of those who finished averaged much higher rates of speed, and yet were not fast enough to win.

Would any technician assert that the same results could have been accomplished simply from four years' experience with touring cars?

SPACES ALLOTTED FOR A. L. A. M. SHOW.

Spaces for the seventh national show in Madison Square Garden, January 12-19, were allotted last Friday, at a meeting of the show committee of the Association of Licensed Automobile Manufacturers. Every bit of available space, including the 8,000 additional square feet, has now been assigned. The method used in allotting spaces this year was wholly different from that of 1905, and it worked to a charm. The importers and the motor and accessories makers had their space granted in bulk, and did their own allotting. What was done by the show committee related to twenty-nine manufacturers of cars who are members of the A. L. A. M. They agreed to the new plan of granting first choice of space to the manufacturer whose output and sales had been largest during the year ending June 30, second choice to the one showing the second largest output, and so on. As all these makers are licensed under the Selden patent and render regular statements as to output, this plan could be followed with exactness and general satisfaction to all concerned.

STRIKE AT THE TOLEDO POPE PLANT.

TOLEDO, OHIO, Sept. 10.—Work at the Pope Motor Car Company's plant in this city is temporarily abandoned in several departments as the result of a strike which has been in force for some days past. According to the statement of the officials of the company, the trouble was brought about by the discharge of a couple of employees who were labor agitators and who in the past have been the cause of considerable trouble. The company states it is succeeding fairly well in securing non-union men to replace those who have struck. Two hundred and forty men, employed in the lathe, screw, drill, and tool departments, are out, but there is talk of the others striking out of sympathy.

A TOUR TO MEXICO BY GLIDDEN.

Charles J. Glidden, the globe girdler, with a mileage of 33,600 miles in 35 countries, intends to drive from Boston to Mexico, starting some time in November. From Boston to Chicago the usual route will be followed, but south from the city on Lake Michigan to El Paso, Tex., there will be more or less use of railroad rails, possibly the entire distance. A visit to the City of Mexico may be made if arrangements can be consummated with the railroad officials. Ultimately Mr. Glidden will reach Galveston, and his automobile will be shipped to Port Said, Egypt, where he will resume his round-the-world tour. Mr. Glidden will return in time for the 1907 A. A. A. tour, in which he will be a participant for the third time.

CONSOLIDATION OF GARAGES AT TRENTON.

TRENTON, N. J., Sept. 10.—The different garages of this city have been recently bought and consolidated by Robert Cleveland, formerly connected with large garage concerns in the Middle West. The company has been incorporated under the name of the "Capitol City Garage Company." A messenger is stationed in each one of the largest hotels, and automobilists touring through the New Jersey capital will find excellent accommodations in the hands of this new concern.

HARTFORD TIRE PRICES TO BE MAINTAINED.

Positive announcement is made by the Hartford Rubber Works Company that there will be no reduction in prices in Hartford automobile tire products during the coming season, despite the late talk about the unsettled state of the tire market. The Hartford Company states that automobilists can bank upon it that any reduction from present prices would have to be solely at the expense of quality, and the company does not care to take that step.

THE N. A. A. M. SEPTEMBER SESSION.

At the September session of the N. A. A. M., held in New York City, it was decided that a drawing for spaces at the Chicago National show would take place at the Association offices on the mornings of October 3 and 4. Association members will draw on one day and other applicants for space on the second day. Application blanks and diagrams will be mailed to the trade in the near future.

Benjamin Briscoe was elected a member of the executive committee in place of George W. Bennett, resigned, and Ezra E. Kirk replaced E. R. Thomas, also resigned. C. T. Jeffrey succeeded George W. Bennett as the representative of Thomas B. Jeffrey & Co., and this change also brought about a vacancy of the first vice-presidency. The list now is first vice-president, Albert L. Pope; second vice-president, F. G. Waldron; third vice-president, Thomas Henderson. Col. George Pope, of the Pope Motor Car Company, of Hartford, and C. A. Benjamin, of the Babcock Electric Carriage Company, of Buffalo, were elected to membership.

PERCY PIERCE TAKES TO THE BICYCLE.

BUFFALO, Sept. 10.—Percy P. Pierce, twice the winner of the Glidden Touring Trophy, made the announcement yesterday that hereafter he will devote his attention exclusively to the bicycle business, as president of the Pierce Cycle Company. The company is officered as follows: Percy P. Pierce, president; W. B. Colburn, secretary and treasurer; George N. Pierce, Charles Clifton, Moses Shire, directors. The company, which is capitalized at \$300,000, will manufacture bicycles at the Hanover street factory, which is now occupied by the George N. Pierce Automobile Company. The automobile business will shortly be transferred to the company's new plant at Elmwood avenue and the New York Central tracks.

A. A. RUSSELL EN ROUTE IN A 1907 HARRISON.

GRAND RAPIDS, MICH., Sept. 10.—A. A. Russell, sales manager of the Harrison Wagon Company, Grand Rapids, Mich., started from Grand Rapids September 11, in a Harrison 50-horsepower touring car, 1907 model, and expects to arrive in New York City Saturday, September 15, after making demonstrations in Detroit, Buffalo, Rochester, and Albany. The 1907 Harrison models are being pushed forward to supply the early fall demand. To facilitate assembling of cars several huge canvas tents are being utilized, giving extra space while new buildings of a permanent character are being erected.

A. A. A. DIRECTORS WILL MEET SEPT. 20.

There will be a meeting of the A. A. A. Board of Directors, Thursday, September 20, two days previous to the American Elimination Trial, at the clubrooms of the Automobile Club of America, 753 Fifth avenue, New York City. President John Farson will be present, and it is probable that many other directors will attend on account of the proximity of the Long Island race.

The National Touring Committee will meet on the morning of September 20, consider 1906 tour matters, and outline something for 1907.

A. M. C. M. A. MEETING ON OCTOBER 5.

There will be an all-day session of the American Motor Car Manufacturers' Association at the New York headquarters, on Friday, October 5. A drawing for the Association spaces at the Grand Central Palace show, December 1 to 8, will take place, in addition to the consideration of other matters of importance. On the following day the Association members will witness the Vanderbilt Cup race, boxes having been reserved for the directors. Manager Reeves reports several new members in prospect.

BAY STATE AUTO TAXATION.

Boston, Sept. 10.—Though it is four months before the legislature will again be in session in this state, and before any more tinkering can be done to the automobile laws, there are even thus early very plain indications that the automobilists have got a tough fight ahead of them to prevent a change in the present statute by which they will be called upon to contribute much more heavily than heretofore in registration and license fees to the treasury of the commonwealth. The movement, in brief, is to abolish the present system, by which the owner of a car pays \$2 for a registration certificate, which is in force until the car changes owners. In place of this fee, it is proposed to establish an annual fee graduated according to horsepower. Under this system a car of low power may be called upon to pay perhaps \$3 a year, while a 50-horsepower machine may have to pay \$8 a year. Another scheme is for a flat fee of \$5 annually.

The committee secured very important backing for its embryo plan this week when it had before it the chairman of the highway commission, which has charge of the administration of the automobile law. The commission also has charge of the building and maintenance of the state highways, which are among the best roads in Massachusetts and most used by automobilists. Mr. McClintock, the chairman of the commission, attended a session of the special committee last week, and he came armed with unexpected data. He declared that the automobiles are ruining the state roads, that the cars driven at speed sweep off the dust that forms the upper covering of the macadam road and that binds the crushed rock together, and then, if repairs are not made immediately, the tires of the cars pull out the stones, causing the road to ravel, and destroying it. He estimated that the damage done by automobiles to the 670 miles of state road in Massachusetts would require an outlay of \$50,000 next year, and that unless something is done to prevent this wear a similar outlay for repairs will be necessary every year. So far this year the gross income of the state from automobile registrations and licenses has been about \$27,000 and the expenses have been \$11,000.

The highway commissioners say that the damage to the macadam roads has only become apparent this year, and they attribute it solely to the fact that the average power of the automobiles has increased with their number, and that with this increase in power has come greater average speed, statute speed limits to the contrary notwithstanding. The annual sliding scale fee suggested by the commission is as follows: Under 10-horsepower, \$3; 10 to 20-horsepower, \$4; 20 to 30-horsepower, \$5; 30 to 40-horsepower, \$6; 40 to 50-horsepower, \$7, and above 50-horsepower, \$8. If the machines now registered—above 13,000—paid these fees, the revenue would be \$52,666, or more than enough to pay the extra damage to the highways caused by automobiles.

The commission, however, has not only considered ways and means of securing revenue for the repair of its roads, but it is also actively engaged in an attempt to discover something which will prevent the wear on the roads. Its latest experiment is with an English solution, to be sprinkled on the roads. An emulsion is made of one part calcium chloride and eight parts of water, and it is claimed that the chemical will attract sufficient moisture to keep the surface of the road in condition so that the dust will not be torn away.

One thing the highway commission has definitely decided not to do, and that is to sprinkle the roads with oil of the kind often used to lay the dust. It is too disagreeable and dirty, and the commission believes that this treatment, in the end, injures the road surface more than it helps.

The Metropolitan Park Commission, which controls about twenty-five miles of parkways in the suburbs of Boston, which are open to automobiles and which are among the most popular drives near this city, is also finding that the automobiles are stripping the surface of the boulevards, and is looking about for some sort of preventive. It has tried an oil application, but does not favor it for general use on macadam roads. On one of its parkways it is now trying an application of tar. This is very

successful, but it is also very expensive, costing about \$1,000 a mile. Meantime city and town park departments and highway engineers in Massachusetts are watching these experiments with great interest, and in some cases are conducting experiments on their own account.

YORK, PA., TO HAVE A LARGE FACTORY.

YORK, PA., Sept. 10.—S. J. Macfarren, a well-known Pittsburg automobile promoter and manufacturer, was in York the past week and closed the contract for the erection of a large automobile factory in the west end of the city. He is representing Pittsburg capitalists and expects to have the plant in operation before long. It is the intention of the Pittsburg men to have a factory from which all kinds of electric and gasoline cars can be turned out.

A party of Staten Island autoists made a record trip to this city yesterday in a large Pullman car, which was manufactured by the York firm. In the party were Mr. and Mrs. C. A. Schultz and Master Charles A. Schultz. They are having some of the latest devices placed on the car at the local factory. Mr. Schultz is president of the Richmond County Automobile Club.

MR. FRANKLIN'S RIDE IN A FRANKLIN.

H. H. Franklin, of the H. H. Franklin Manufacturing Company, is taking a long ride in a Franklin six-cylinder car. Mr. Franklin toured from Syracuse through the Mohawk Valley, down the Hudson River, through New Jersey and Pennsylvania, into Maryland and on to Washington; thence retracing back to New York, and taking a look at the Vanderbilt Cup course on Long Island. A New England run that will extend through Connecticut and include Massachusetts, will be accomplished before the return to Syracuse. Mr. Franklin is covering an average of 150 miles per day, making note of the troubles that come to the ordinary tourist, keeping a record of gasoline and oil consumed, speed maintained, and various other things which tend to show what is good or bad about the Franklin car.

A HORSE ON THE CADILLAC.

The enterprising agents of the Cadillac Motor Car Company at Richford, Vt., Manuel Bros., conceived the idea of mounting a horse on a chassis, and entering the float thus arranged in a recent parade held in that city. The little car handled its load of 800 pounds of horseflesh with apparent ease, and the horse seemed to enjoy the novelty of the thing as much as the assembled citizens who witnessed the parade. Manuel Bros. state that the exhibit proved an excellent advertisement for the automobile.



NOVEL FLOAT USED IN PARADE AT RICHFORD, VT.

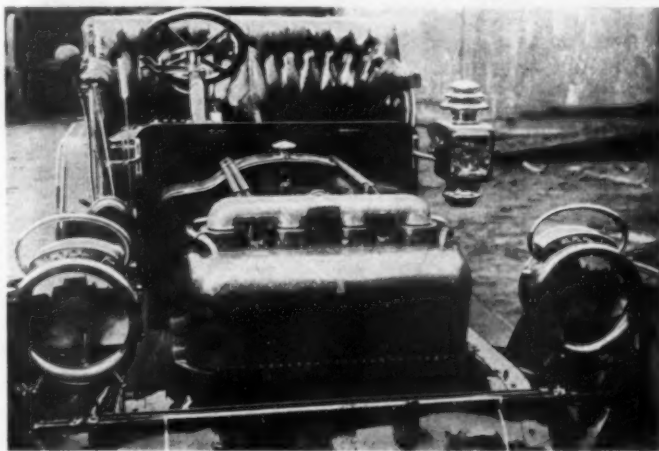
THE FIRST CHRISTIE FRONT DRIVE TOURING CAR

American designers of automobiles have frequently shown a marked tendency to stray from the rather narrow way laid out by designers of automobiles of what is called the "conventional" type, and this persistence has resulted in the development of large air-cooled motors, the double-opposed motor and many other features that have attained their highest form on this side of the Atlantic. A survey of the cars manufactured in this country will show that this spirit has by no means died out, and that some remarkable work is being done by machines that differ widely from the type considered orthodox by many foreign and domestic builders. Among these original conceptions is the car built by Walter Christie, of New York, whose reputation was made by inventing and building revolving turrets for battleships before the automobile invaded the Christie Iron Works near the foot of East Eighteenth street.

After having built racing cars to thoroughly test out his idea of using the front wheels of his car for both driving and steering, and after many discouraging troubles with details, Mr. Christie produced a car that showed its mettle by covering a mile on a beach course in 35 1-5 seconds. The racing car, however, was looked upon as being but a step toward the touring car, and the first model of the utility machine has now been completed and is

weight of the rear part of the car, which has nothing to carry but the bodywork and the passengers.

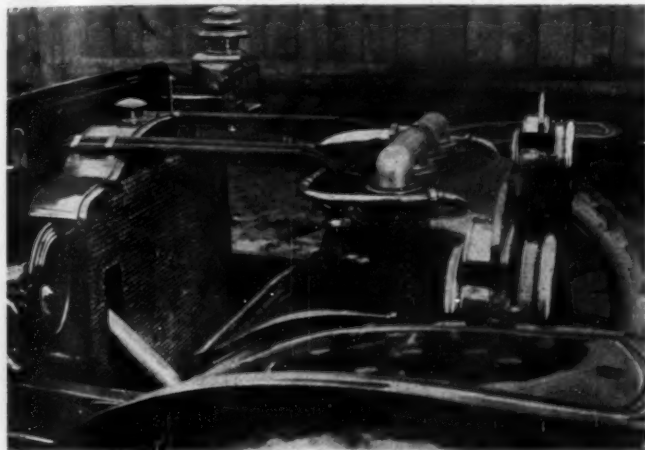
As the engine is placed at the extreme front end of the car,



FRONT OF CHRISTIE TOURING CAR SHOWING COPPER WATER JACKET.

the radiator must be placed somewhere else, and it is found directly in front of the dashboard; the steering column passes through an opening in the radiator. In the engine base is all the gearing. The single camshaft drives the rotary water circulating pump and the timer, both of which are in the casing. The carburetor is in the casing on the left-hand side, where it is protected from damage and is kept warm; the air inlet consists of a pipe leading through the casing, its mouth covered with a fine wire gauze. When the cover is put on the casing there is not a moving part visible, unless one doubles up and gets a glimpse of the hopping valve-stems—and even these are invisible when the hood, covering both motor and radiator, is put on. The cylinders of the engine are enclosed in a sheet copper water-jacket with a smooth surface. The hood covers this also when in place.

The wheels are thirty inches in diameter and are fitted with 4-inch tires. The rear axle is of peculiar form in order to allow the dropping of the body. Brake drums are attached to the rear wheels by means of bolts passing through enlarged parts of the



GENERAL VIEW OF POWER PLANT OF CHRISTIE FRONT DRIVE CAR.

on the road. It will command careful attention from the outset.

As the accompanying photographs show, the car is very different from the usual type of touring car. The motor, rated at 50 horsepower, has four vertical cylinders, but instead of being placed in the usual fore-and-aft position, it is hung directly between the front wheels of the car, with the crankshaft extending across. In fact, the crankcase of the motor, made of manganese bronze to withstand the stresses, forms the front axle, and the drive is transmitted direct to the front wheels through suitable gearing and universal joints, the latter permitting the wheels to swing on pivots for steering. Thus there is no driving mechanism whatever back of the dashboard. Another point is that there is no differential and no sprockets on the rear axle or wheels, so that it is possible to drop the body of the car very low without making the road clearance any less than in the ordinary type of car. This low-hanging body is a distinctive feature of the machine, and the low, easy steps and easily entered tonneau give the machine a most comfortable appearance.

Owing to the peculiar arrangement of the driving mechanism and front wheels, elliptic or semi-elliptic springs of the usual type are not used in front, but the front of the car is carried by springs made from flat strips of spring steel wound into an elongated cone shape. Rear springs are semi-elliptics, long and flexible, and these can be made very light on account of the very light



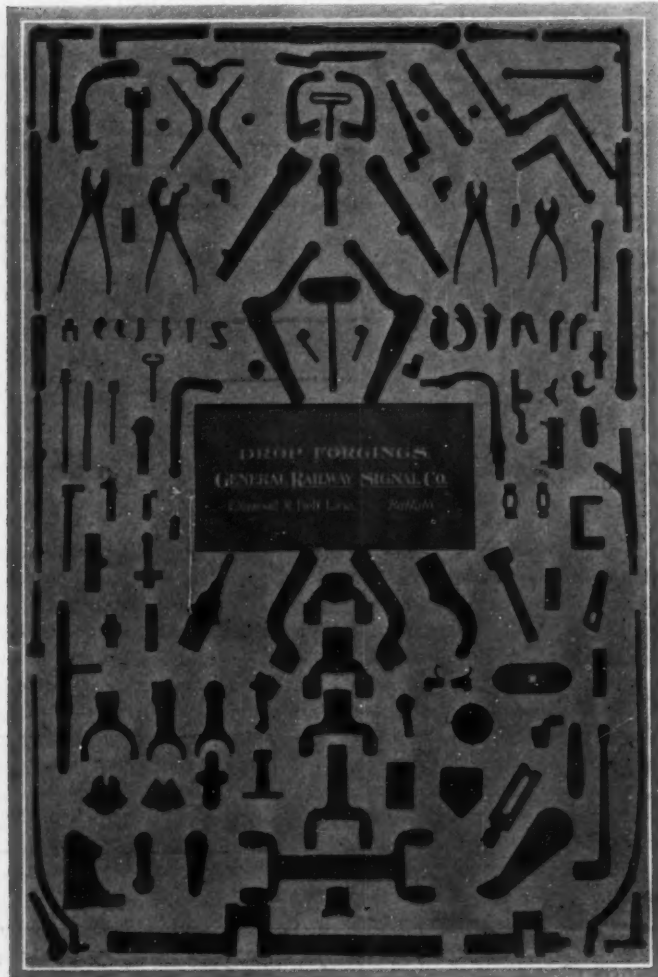
CHRISTIE FRONT DRIVE 50-HORSEPOWER TOURING CAR.

spokes. Framing is of channel steel and is very light, as the load it has to carry is light and the framing is subjected to no driving stresses, the rear part of the car being drawn, as it were,

The car is finished in blue, with black leather upholstery, black striping, and presents an attractive appearance.

A WELL-EQUIPPED FORGE PLANT.

For the past year and a half the General Railway Signal Company, of Buffalo, N. Y., has devoted the output of its Buffalo forge shop to custom work, and its Rochester plant to work connected with the signal business. The company almost exclusively manufactures forgings from private design, and caters especially



to the automobile trade, as a reference to the illustration published in this column shows—a sample board of forgings, which illustrates to some extent the various types used in automobile construction.

During the past year the company has more than doubled its capacity, and now announces that it is just completing further additions to its shop. The equipment of its forge shop embraces a number of board drop hammers, weighing from 600 to 1,800 pounds, giving the widest range necessary for forgings used in automobile work, and permitting the manufacture of forgings from the smallest rods, turnbuckles, etc., to the larger parts, such as steering knuckles, crankshafts, etc. The hammers are operated by a number of separate power units, thus insuring against a complete breakdown of the plant, and the electrical energy is furnished direct from Niagara Falls.

Oil furnaces are used exclusively, permitting the maintenance of a uniform heat at the most desirable forging temperatures to suit the work in hand, or the quick raising or lowering of the temperature at the will of the operator, to suit varying forging conditions. Air blast for the furnaces, installed in duplicate, as well as for blowing scale from the dies, is of ample pressure and volume, and presses for hot work are set close to the hammers, permitting forgings being quickly restruck after trimming.

In addition to drop forging, the General Railway Signal Company is equipped for heading or up-setting, as well as bending or bulldozing, and Bradley hammer work. These bulldozer ma-

chines enable the manufacturer to obtain readily and cheaply from comparatively inexpensive dies, tubular axles, rods, forgings, etc., bent to any shape desired to meet their individual requirements. On the heading machines, valves, rivets, yokes, etc., are readily upset or headed. The die room is of ample size, and is equipped with the most modern die-sinking machinery.

The General Railway Signal Company states that, with the increased size of forging plant, it can furnish early deliveries of first-class forgings, and, further, having ample capital, it is able to enter into and execute large contracts.

A NEW CRANK MECHANISM.

The Ramsey Engine Company, with offices in the Bullitt Building, Philadelphia, has been formed to exploit the Ramsey crank mechanism, which is applicable to automobiles as well as ordinary land and marine internal combustion engines. The mechanism comprises a connecting rod made approximately three and three-eighths times the length of the crank, and a crank of ordinary design with the shaft located from the central axis of the cylinder a distance equal to the length of the crank. The company states that in comparative tests a marine motor with 9 1/2 inch by 14 inch cylinder was constructed on conventional lines but fitted with the new crank mechanism and showed a fuel consumption of 1-10 to 1-11 of a gallon per horsepower hour. The engine of the ordinary type from which the trial engine was copied had a fuel consumption of 1-8 gallon per horsepower hour. Tests conducted by the University of Pennsylvania are reported to have shown a total heat efficiency of the engine fitted with the Ramsey mechanism of 24.1 to 25.9 per cent. Advantages claimed for the mechanism include: increased expansion, greater piston stroke and crank effort, decreased friction, quick compression. Patents covering the device have been issued in the United States and several foreign countries.

CITIZEN BRYAN'S DETROIT AUTO RIDE.

DETROIT, MICH., Sept. 10.—Tradition was cast to the winds during the visit of William Jennings Bryan to Detroit on the way to his Nebraska home. Taking its cue from the course pursued in New York, the local Democratic reception committee met the Bryan party at the depot with carriages, conveying the distinguished visitors to the Hotel Cadillac in truly orthodox style. In the afternoon, however, Mr. Bryan forsook this mode of locomotion, stories of his aversion to automobiles to the contrary notwithstanding, and, entering the Thomas Flyer belonging to Bandmaster Innes, an old friend, was given a drive about the city. The accompanying picture shows Mr. Bryan seated in the car shortly after having addressed 25,000 persons at the State Fair grounds. In front of Mr. Bryan is Mayor George P. Codd, of Detroit, and to his left, also seated, is Gilbert Dickson, president of the Detroit Federation of Labor.



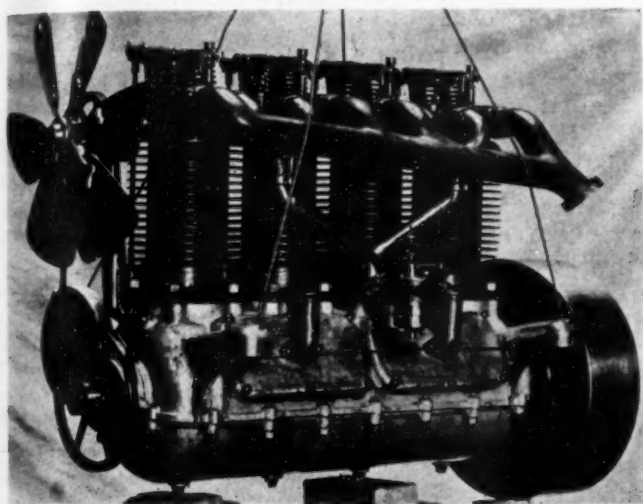
MR. BRYAN AND RECEPTION COMMITTEE IN THOMAS FLYER.

TEST RUN OF AN AIR-COOLED MOTOR.

Air-cooled motors have been doing a good deal of unusually interesting work this summer, and the air-cooling system is consequently prominently before the public. One of the most recent tests of this cooling system was made by the Speed Changing Pulley Company, of Indianapolis, Ind., with a view to thoroughly testing the ability of the 1907 model Carrico air-cooled motor, manufactured by that concern, to keep cool while doing hard work. For the purpose of making the trial the motor was installed in a touring car weighing 2,750 pounds, and the car was run a total distance of about 2,500 miles, with satisfactory results. The car is known as the De Tamble car.

With four vertical cylinders of 4 inches bore and 4 inches stroke, and a compression of 50 pounds to the square inch, the motor is rated at 20-24 horsepower. Flanges are cast integral with the cylinders for cooling, and a current of air is thrown on the cylinders by a belt-driven fan carried by a bracket bolted to the front end of the crankcase. After being bored the cylinders are ground inside to insure roundness and parallelism; the variation from size must not exceed .002 inch.

Particular attention has been given to the valves, which are placed in the cylinder heads and are mechanically operated, long



CARRICO AIR-COOLED 20-HORSEPOWER MOTOR, CAMSHAFT SIDE.

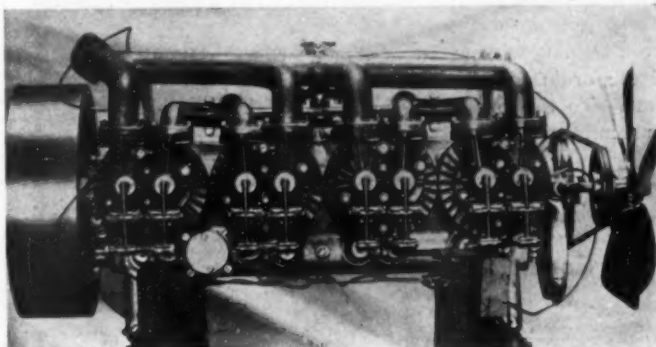
push-rods actuating rocker arms which in turn move the valves. Each valve is placed in a cage and ground on a flat seat; each cage is held in position by four cap-screws, which can be easily removed and the cages containing the valves lifted out for inspection or grinding.

Exhaust manifold and carbureter are both on the same side of the engine—the left—and the carbureter is easily reached for adjustment. The Universal carbureter, made by the manufacturers of the engine, is fitted. The complete engine weighs about 375 pounds.

For the sake of lightness the crankcase is cast of aluminum alloy. The case is split horizontally, the arms for attaching the motor to the frame of the car being cast integral with the upper half; the bearings are attached to the upper half, so that the removal of the lower half permits the inspection of the crankshaft and connecting rods without disturbing the bearings. Acting practically as an oil retainer and dust shield, the lower half is subjected to but little stress. Crankshaft is made from a steel drop forging from the shops of Wyman & Gordon and is ground to size after being subjected to a toughening process.

Main bearings—the crankshaft bearings—and the bearings in the connecting rod big-ends are of Parson's white brass, hand scraped to their journals. Six thin brass shims are inserted when the bearing is fitted, so that to make adjustments it is only necessary to remove a shim from each side of the bearing, or as many shims as are necessary to take up the wear, and again tighten down the bolts.

Tough, close-grained cast iron is used for the pistons, which are made very light. Four eccentric rings are fitted, each 5-16 inch wide, with joint cut at an angle of 45 degrees. The camshaft is accurately ground, and the cams, of hardened and ground steel, are keyed to it by means of Woodruff patent keys; the shaft runs in three brass bearings. A vertical shaft, bevel-gear driven



TOP VIEW OF THE MOTOR, SHOWING VALVE OPERATING LEVERS.

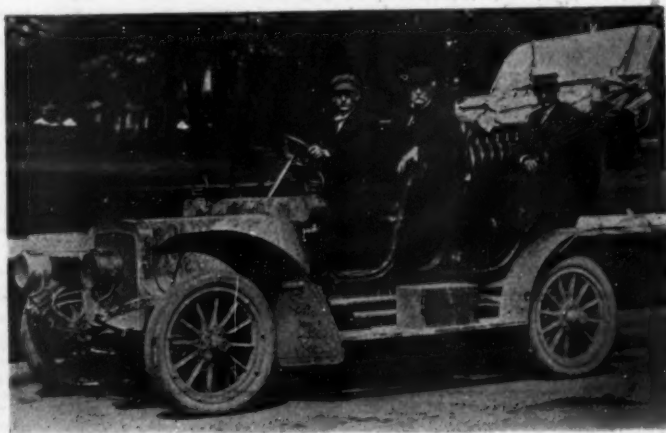
from the camshaft, carries the timer, and the upper bearing of the shaft carries the weight of the shaft and fittings and takes the thrust of the bevel gears. The upper bearing also carries supports for the wiring.

Cooling is greatly assisted by a 15-inch fan running on annular ball bearings at the front of the motor and driven by a belt. The fan is supported by a steel forging, and this, in turn, is carried by a manganese bronze casting bolted to the front end of the engine crankcase.

At present but one size of the Carrico motor is built, but the designer is now at work on a water-cooled motor to develop from 40 to 60 horsepower, of the four-cylinder vertical type. This motor will be exhibited at the December show in New York.

Recently a special test trip was made with the car, when three passengers were carried, their aggregate weight being 500 pounds. Starting at 5 o'clock in the morning, the car was run from Indianapolis to Columbus, a distance of 189 miles, reaching the latter place at 7:50 P.M., with no overheating and no troubles that could be ascribed to the engine. During the run 17 gallons of gasoline were consumed, and about a third of a gallon of lubricating oil.

On the following day the return trip was started, the car leav-



DE TAMPLE TOURING CAR IN WHICH CARRICO MOTOR WAS TESTED.

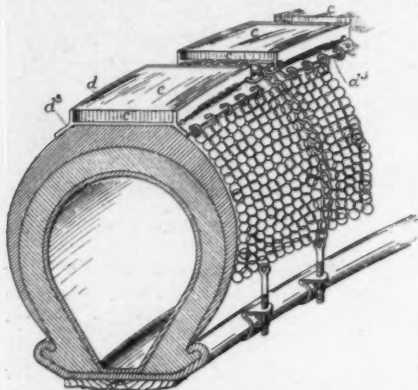
ing Columbus at 3:42 in the afternoon, and the night was spent at Richmond, 115 miles from Columbus. Indianapolis was reached without particular incident, except that the fan belt came off and the motor ran for several miles without deriving any benefit from the fan at a time when the temperature of the atmosphere was 90 degrees. Sixteen gallons of gasoline and three pints of lubricating oil took the car home after a trip that was highly satisfactory to F. D. Carrico, the designer of the motor.

Patents

Non-Slipping Tire Tread.

No. 828,641.—I. Clifford, of London, England.

This is a form of tire tread designed to avoid slipping without the destructive effect of the ordinary armoring devices on the tread. To this end the tread is raised in consecutive squares *c c* spaced a short dis-



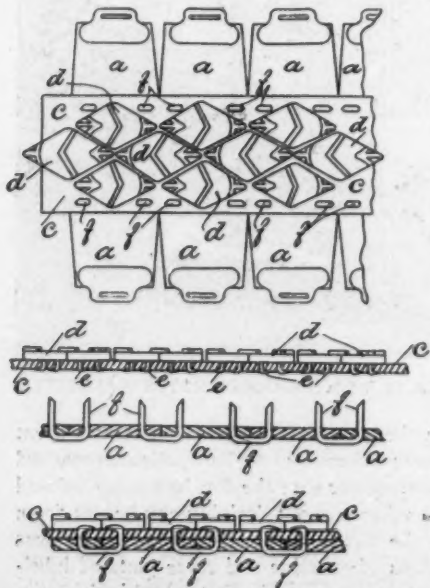
CLIFFORD'S NON-SLIPPING TIRE TREAD.

tance apart, and each of these rubber squares is confined at its edges by a metal frame *d* having side flanges *d'* so shaped as to bear firmly against the sides of the tread. Chain armor of the form shown holds the metal frames in place, the armor following the contour of the tire and being flexible to a certain extent. Bolts attached to the edges of the chain armor serve to hold the tread in place on the tire, these bolts being placed at frequent intervals. The tightness of the tread can be adjusted by means of the bolts.

Detachable Non-skidding Tread.

No. 829,496.—R. Wallwork, of Manchester, Eng.

A detachable cover comprising three ele-



WALLWORK'S DETACHABLE NON-SKID.

ments: a series of short transverse segments *aa*, held on the tire by straps or otherwise; an endless leather strip *c*, permanently attached to *aa* by the wire fasteners *ff*; and the small metal plates *dd*, roughened on their surfaces and secured to *c* by rivets *ee*. The intermediate views show how *c* is fastened to *aa* after the plates *dd* have been attached, and the bottom view shows the whole assembly in section.

Hood.

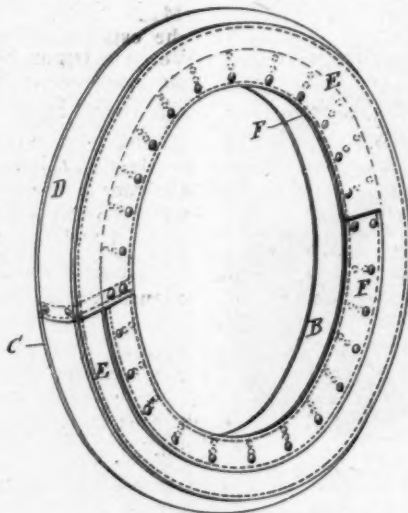
No. 829,498.—C. Wright, of Chicago.

A hood jointed lengthwise to fold up. The joints are so creased and folded as to form eaves to shed the water in case of rain.

Tire Cover.

No. 828,701.—W. A. Allen, of New York City.

A cover made with an inside strip *B*, outside strip *D*, two side strips *C E*, and a circular flap *F* attached to *B* and divided



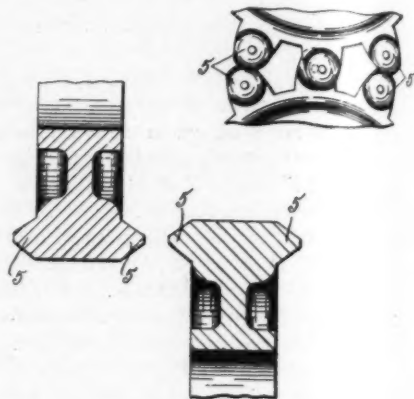
ALLEN'S RAINPROOF TIRE CASE.

horizontally, so that the upper half can button inside and the lower half outside of *F*, thereby shedding any rain that may fall on it and keeping the tire dry.

Sliding Gear.

No. 829,926.—W. C. Lipe, of Syracuse, N. Y.

The ordinary sliding speed-change gear, with pointed bosses *5 5* on the ends of the



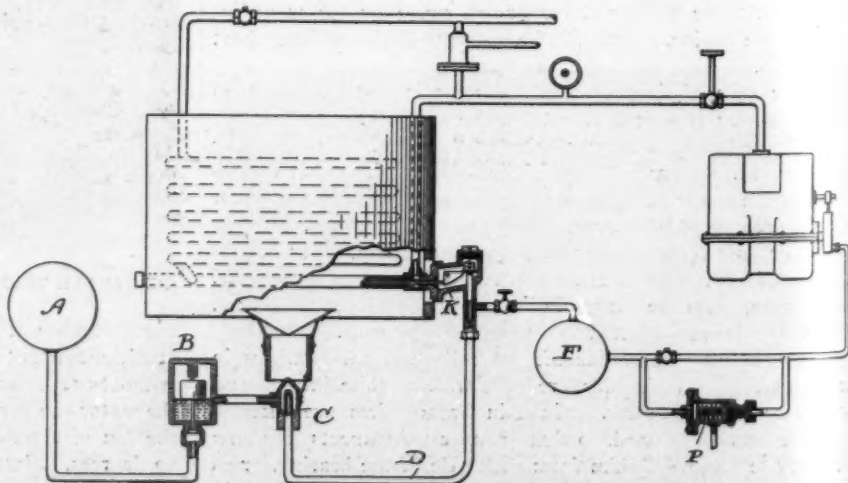
LIPE'S GEAR-TOOTH ENDS.

teeth, which are intended to permit easy engagement. They act as a substitute for the customary chamfering of the ends of the teeth.

Kerosene-burning System for Steamers.

No. 829,451.—R. H. White, of Cleveland, Ohio.

A system for spraying kerosene to a fire under a flash steam generator by means of compressed air. The kerosene is contained in tank *A*, and its passage to the burner *C* is controlled by the constant level chamber and float valve *B*, similar to those used in carbureters. The air is contained in tank *F* and is compressed by a constantly running pump on the engine. From the tank to the burner its passage is controlled by the thermometer and valve *K*, precisely similar to that employed to control the fuel feed of the White steam car when burning gasoline. A diaphragm regulator *P*, similar to that employed to regulate the water injection to the generator, is used to control the air pressure.



WHITE'S KEROSENE BURNING SYSTEM FOR STEAM CARS

NEWS AND TRADE MISCELLANY.

According to the London *Financial Times* there are signs of an invasion of Great Britain by the American automobile manufacturer, and it publishes the statement that the Pope Manufacturing Company is looking up a good location for a West End showroom in the world's metropolis.

A. R. Mosler & Co., 163 West Twenty-ninth street, New York, makers of the Mosler spark plug and eccentric snap-off timer, were incorporated September 8 under the laws of the state of New York. The leading officials of the corporation are A. R. Mosler, president, and William G. Leibling, secretary and treasurer.

The Borbein Auto Company, 2109-2111 North Ninth street, St. Louis, has been incorporated, and succeeds to the firm of H. F. Borbein & Co., the well-known makers of automobile running gears, bodies and parts. H. F. Borbein is president and general manager, and W. L. Johnson, vice-president and secretary.

The first American automobile to cross the ancient drawbridge and enter the courtyard at Stirling Castle, Scotland, is the distinction gained by a Corbin car, owned and driven by John W. Mills, president of the Rhode Island Supply and Engineering Company, of Providence, during a recent trip through England and Scotland covering about 2,500 miles.

The Long Manufacturing Company, manufacturers of Long's patent spiral-tube radiators, has removed to its new building, 1430-34 Michigan avenue, Chicago, in the midst of that city's automobile row. The steadily increasing business of the company has necessitated larger quarters, and the new salesrooms and offices are in keeping with the steady advance that has been made by this concern.

The Dayton Electrical Manufacturing Company, of Dayton, O., has issued a revised edition of its Bulletin No. 1, which describes the well-known Apple ignition system, manufactured by the company, and gives automobilists and gas engine users valuable information regarding both touch and jump-spark ignition. It is a good manual to have in one's possession and will be sent free of charge upon application.

The National Surety Company, of New York City, recently appealed to the Police Commissioner regarding the action of some of the police captains and sergeants declining to accept a surety company's bond. The Police Commissioner has issued a general order instructing all police officers, empowered to accept bail, that the bonds of the National Surety Company are to be accepted on proper verification of the holder thereof.

The Chicago Packard Company, the new agents for the Packard in that city, is now comfortably located in its new quarters at 1334 Michigan avenue, the store formerly occupied by the Peerless agency. A new store of larger dimensions, specially constructed to meet the business demands of the company, will soon be erected further south on Michigan avenue. The company is officered as follows: President, Waldo P. Johnson; vice-president, W. L. De La Fontaine; treasurer, E. R. Lightcap.

The announcement that R. M. Owen & Co. will act as general sales agents for the Reo Motor Car Company of Lansing, Mich., marks an important step in the advancement of that successful factory. The Owen company guarantees to take the entire output of the Reo factory, which will leave the factory free to manufacture exclusively. As the firm's name indicates, R. M. Owen is at the head of the selling house, with R. C. Rueschaw as his chief assistant. The headquarters will be at Lansing.

The Dragon Automobile Company of Philadelphia has opened offices in the Campau building, Detroit, Mich., and is progressing rapidly with its models for next season, which will consist of a four-cylinder light touring car, with shaft drive and sliding gear transmission, to sell for about \$1,500, and a gentleman's roadster, on the same chassis as the touring car. Henry Rawle, general manager, and Frank S. Curlew, vice-president and sales manager, are in Detroit completing arrangements for the show cars.

The plans of the Maxwell-Briscoe Motor Company for the establishing of a large plant in the West are beginning to assume shape. A proposition has been made to the municipalities of several cities in Central Western states, and Benjamin Briscoe, president of the company, has been inspecting proposed sites in Elkhart, Marion, Muncie, and Kokomo, Ind. The company intends combining several or all of its plants in some of these cities and intends building what will probably be the largest factory for the manufacture of automobiles in the world.

An American recently abroad remarked the other day: "A short while ago I was in Paris, where of course motor cars are as thick as bees. I was agreeably surprised to see approaching a trim looking electric, which upon investigation proved to be an American production, a Columbia brougham. I hadn't seen home for six months, and I tell you it did me a world of good to see a Yankee car on French soil, and, as for appearances, it looked the part. Perhaps you will appreciate my feelings when you are in a foreign country and haven't seen home in a dog's age."

The Stamford works of the Lozier Motor Company at Stamford, Conn., heretofore operated under a lease from the Ball Manufacturing Company, has been purchased outright and will be operated by the Lozier Motor Company as an adjunct to the main works of the company at Plattsburg, N. Y. The Stamford works are being refitted and put in condition with a view to utilizing the plant to its fullest capacity on the 1907 work, and will enable the company to materially increase the output for 1907. Additions have been made to the Plattsburg works, and this plant is now operating to fullest capacity.

Ward Grow, president of the Grow Automobile Company, Osage, Ia., recently completed a notable run from Rochester, N. Y., to his home in a Mora roadster, a distance of 1,300 miles in six days, the actual running time of which was 69 hours and 20 minutes. The longest day's run was 278 miles in 11

hours and 10 minutes, and the shortest day's run was 146 miles in 10 hours and 40 minutes. During the trip one nut came loose on the universal joint and damaged the keyway in the yoke, but repairs were made on the road and replacement made on the arrival of Mr. Grow at Osage, Ia.

According to reports made at the office of the American Motor Car Manufacturers' Association, there were 91 cars imported during the month of July, at a total valuation of \$545,774. This is a decrease from July, 1905, when 101 cars were imported. There were 701 cars imported during the first seven months of the year. On the other hand, exports for July were double those for 1905, showing that the American motor car industry is reaching out for the world's trade. There were 266 cars exported, of a total valuation of \$485,672. During the first seven months of the year the exports amounted to \$2,829,289.

"From the time I landed at Liverpool to crating the car for home," says John W. Mills of Providence, R. I., describing an interesting trip abroad, "I made a total of 2,435 miles, consumed 138 gallons of gasoline and used a trifle less than 3 gallons of lubricating oil in and on the engine. On account of many thinking that an air-cooled car must be flooded with oil, I tried for a record as to the amount of lubricating oil necessary on my Corbin engine, and on my return home made a close examination of the cylinders, pistons, rods, cranks and crankshaft, including all bearings, and found them all in perfect condition."

On August 30 F. A. Babcock, Jr., and Walter Winchester, of the Babcock Electric Carriage Co., Buffalo, N. Y., drove one of the Babcock electric cars from Buffalo to Rochester on one charge of the battery—a distance of 71 miles. After charging the battery in Rochester they returned to Buffalo, thereby duplicating the performance, and by going out of their way an extra five miles the return trip was 76 miles. Total mileage for the day, 147 miles. The trip was made for the purpose of demonstrating the great mileage ability of electrics and the remarkable development made in the electric vehicle construction in the past year. The car used was a regular stock Model 5 Babcock, with regular motor and battery equipment.

NEW AGENCIES ESTABLISHED.

The White Garage, Los Angeles, Cal., agents for the White steamer, has secured the agency for the Pope-Tribune and Pope-Hartford lines.

W. B. Brown, formerly Waverley electric agent at Pittsburg, Pa., has taken the Southern California agency for the Waverley at Los Angeles.

Paul Lacroix and the Count de Montaigne, the latter a director of Renault-Freres, have arrived in this country for the purpose of establishing an American branch for the marketing of Renaults. M. Lacroix, who is well known on this side of the water, is to have charge as branch manager.

C. E. E. Cook, recently of San Francisco and Los Angeles, has organized a company and is fitting up a garage at 1408-10 Walnut street, Kansas City, Mo. He has already secured the Pierce agen-

cy, which E. P. Moriarty & Co. have relinquished, and is also to handle the Olds line next season.

The location of the new salesroom of the Boston branch of the H. H. Franklin Mfg. Co. has been decided upon, 671 Boylston street being the place, where a spacious store of pleasing appointment is being prepared for the sale of Franklins. The store is well located, being opposite the Boston Public Library and the Medical Department of Harvard University, and but a short distance from the Massachusetts Automobile Club on the same street. The salesroom only will be at the above address, and a spacious and well equipped repair shop will be located in another quarter.

PERSONAL TRADE MENTION.

H. H. Thorp has severed his connection with the Aerocar Company, of Detroit, Mich., with which concern he occupied the position of sales manager.

Willy Tischbein, one of the directors of the Continental Caoutchouc & Gutta-Percha Company, of Hanover, Germany, and president of the Continental Caoutchouc Company, of New York, will arrive in this country September 25 on the Kron Prinz Wilhelm. He will attend the Vanderbilt Cup race and look after business matters pertaining to the Continental company.

Recent Incorporations.

Pittsburg Auto Express Company, Pittsburg, Pa.; capital, \$25,000.

Dewhurst Motor Car Company, Lexington, Ky.; capital stock, \$25,000.

Maine Elastic Tire Filling Company, Portland, Me.; capital, \$10,000. Incorporators, J. P. Bodge and E. G. Hagge.

The Automobile Transit Company, Milwaukee, Wis. Incorporators, Frederick G. Rodenbeck, Oscar L. Bland and Charles Ronde.

Standard Motor Truck Company, Pittsburg, Pa.; capital, \$10,000. Incorporators, C. C. Rinehart, J. M. Hansen and William Bierman.

Ettwein Motor Car Company, Kansas City, Mo.; capital, \$20,000. Incorporators, Charles F. Ettwein, Frank B. Clyatt and Ernest L. De Camp.

Railway Auto Car Company of New York; capital, \$10,000. Directors, H. Rieman Duval, Franklin Q. Grown and Charles Ducas, all of New York.

North End Garage Company, New Bedford, Mass.; capital, \$1,500. Incorporators, Dominique J. Jarry, George W. Auger and Moise D. Prevost.

Jackson Automobile Company, Kansas City, Mo.; capital stock, \$10,000. Incorporators, Calvin B. Richards, Otto E. Seager and Abram W. Frank.

Hecla Manufacturing Company, New York; capital, \$35,000. To manufacture motors. Incorporators, H. C. Messiner, G. H. Sonnenborn and H. H. Pierce.

The Sid Black Automobile Company, Cincinnati, O.; capital, \$50,000. Incorporators, Sid Black, C. J. Neare, Max S. Goldsmith, John Littleford and S. C. Gosborn.

Snyder & Co., Newark, N. J.; capital stock, \$25,000. To manufacture automobiles. Incorporators, Harry H. Pickling, Charles O. Geyer and A. W. Condit.

Union Automobile Garage Company, Akron, O.; capital, \$5,000. Incorporators, E. D. Val-

entine, Lottie G. Martin, Claude L. Calbetzor, Fred E. Hilbert and George S. Cox.

Longest Bros. Company, Louisville, Ky.; capital stock, \$10,000. To deal in automobiles and gasoline motors. Incorporators, W. B. Longest, T. F. Longest and C. F. Longest.

Liquid Vending Machine Company, Oshkosh, Wis.; capital stock, \$100,000. To operate gasoline vending machines. Incorporators, F. E. Mitchell, Edith B. Mitchell and A. H. Sage.

Automobile Parts and Equipment Company, Chicago, Ill.; capital, \$25,000. To manufacture and deal in automobiles and automobile supplies. Incorporators, Horace W. Book, Arthur B. Peas and Albert H. Fry.

Rose Automobile Company, Spokane, Wash.; capital stock, \$50,000. To deal in and repair automobiles. Incorporators, Clarence H. Rose, Duman L. Rose, Charles D. Bibbins, Charles White and Moses Oppenheimer.

THE GROWING GARAGE LIST.

Contracts have been let for the building of a garage in Pasadena, Cal., which will, it is said, be the largest on the Pacific coast.

A garage has been opened in Nahant, Mass., by Frank J. Gosseline. The building, now fitted up for the horseless carriage was formerly a stable.

Arrangements are being made to build a garage at Lagoon, Utah, a place near Salt Lake, on the most popular local automobile route. A garage is badly needed there.

The Wolf Peterson Automobile and Machine Company, of Chicago, has opened a garage and repair shop at 1219 Devon avenue. The company will commence to build cars in the fall.

Automobiles will be sold, repaired and stored at the new Gem City Automobile Company, of Quincy, Ill., at 114 North Seventh street. A. F. Whistler, of Muscatine, Iowa, will be in charge.

Temporary quarters for the Tulsa Automobile Company, of Tulsa, Ind. Ter., have been established in a livery stable, pending the selection of a site for a permanent garage. The agency for the White car has been secured.

Work has been commenced on a garage in Salina, Kan., for the Natural Body Brace Company of that place. This concern is preparing to manufacture automobiles of its own design, and already has the first machine nearly completed.

The Thompson-Schoeffel Company, of Rochester, N. Y., will rebuild its garage destroyed by fire at 26 Plymouth avenue, and plans have been filed for a building mainly of concrete construction, to cost \$15,000. W. C. Walker is the architect.

A new garage has been opened at Harrison street and Central Park avenue, Chicago, under the name of the Garfield Park Garage. Expert repairing is undertaken, fireproof storage is provided, and automobiles are bought and sold.

H. B. Hine and Clarence Feese, of Elyria, O., have opened a garage at that place under the name of the Auto Inn. Repair and storage facilities are provided, and special attention is given to emergency work. Supplies are carried in stock.

Wheeling, W. Va., is to have a new garage. A well-known sporting goods dealer of that city, Jason C. Stamp, is interested in the project, together with other business men, and work has been commenced by tearing down buildings now on the property on which the new garage is to be erected.

Peter C. Rutan's garage on North street, Middletown, N. Y., has been sold to H. C. Fairchild and August Bretthauer, of Passaic and Paterson, N. J., who will hereafter conduct the garage, storage and business, retaining the old force of men. A joint stock company will be organized, with Mr. Fairchild as president and Mr. Bretthauer secretary and treasurer.

Slot machines for the sale of gasoline to automobilists and motor boatmen are to be put in operation by the Liquid Vending Machine Company, of Oshkosh, Wis. The machines will be placed along the automobile-traveled roads and on the banks of rivers where motor boats congregate. By putting a coin in the slot and turning a crank the volatile fluid will gush forth and enable the thankful motorist to get home in time for supper.

The Golet estate will build at Broadway and Sixty-fourth street a garage that will, it is reported, be the largest in New York City. The cost will be \$500,000. The building will be on the northeast corner and will be six stories high. The plot of ground measures 174 by 110 feet and has an L that extends to Sixty-fifth street and is 75 feet wide. The garage will have a floor space of 180,000 square feet and will be capable of housing 1,500 cars.

It is expected that on November 1 the Zorn-Strauss Company, of Louisville, Ky., will occupy its new garage. The building is two stories high and measures 110 by 120 feet. On the first floor will be storage and show rooms, offices and a reception room for ladies. On the second floor there will be a complete repair shop with the requisite machine tools, and a tire repair shop, with all the facilities for doing tire work up to the retreading and vulcanization of tires. The garage is on the northeast corner of Second street and Broadway.

A curious case of the automobile going up and the horse coming down is reported from Indianapolis, Ind. Frank A. Beck, who has for years run a large livery stable at 25-27 West Claire street, has removed his livery business to a place about half the size of the old stable, and has overhauled and refitted the large place to be used as a garage and automobile salesroom. The new garage has a floor space of 35x187 feet and is two stories high. The agency for the Pope-Toledo has been obtained, and a low-priced runabout will be added later.

NEW STAGE LINES.

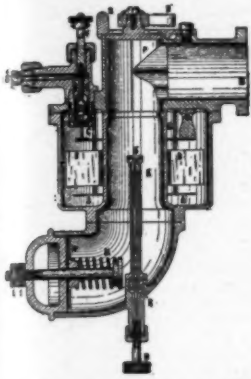
C. W. Gray's automobile 'bus line, recently established in Watertown, N. Y., is using two machines and doing such a thriving business that two more cars have been ordered.

The Trinidad Automobile Transportation Company has been organized in Pueblo, Col., with a capital stock of \$25,000. Automobile stage lines, carrying freight and passengers, will be run to the various camps in the neighborhood of the city.

The Muskegon Auto Service Company is the name of a new concern, which is about to commence business in Muskegon, Mich. Fred and Ray Torrent are the proprietors. The company expects to do an auto livery and repair business. One of the newest features of the company's business will be a regular auto stage line from the Chicago boats to the resorts at Lake Harbor and North Muskegon. For this and for excursion and outing parties the company has purchased a new Rapid sightseeing car, having six seats and a capacity of 12 to 20 persons.

INFORMATION FOR BUYERS.

CENTRAL JET CARBURETER.—An interesting carbureter of the type in which the spray nozzle or jet is placed in the center of an annular float chamber is manufactured by the Generator Valve Company, under the name of the "Reliable" carbureter, and is marketed by George W. Condon, of 36 Warren street, New York. The accompanying illustration shows the arrangement of the parts and will give a clear idea of the



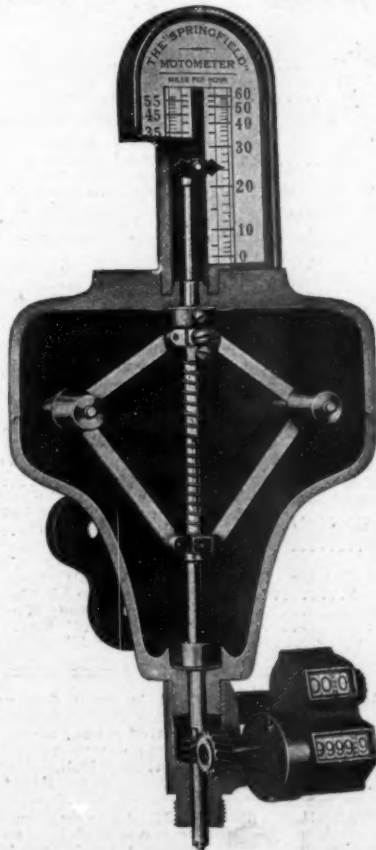
"RELIABLE" CENTRAL JET CARBURETER

principle of operation. Some of the special features are that the float is guided in glass bearings; the float level can be adjusted from the exterior while the motor is running; the carbureter primes automatically, and does not flood, and the entire carbureter can be taken apart, without disturbing any adjustments, by removing four screws. The carbureter consists of a float chamber, through the center of which passes a large tube which forms the mixing chamber, the spray nozzle being in the center of the chamber. At the bottom of the tube is the air inlet, with a spring-controlled valve for regulating the flow of air, and at the top is the flange for connection with the fuel pipe leading to the motor. Gasoline is led from the float chamber by passages cast in the walls of the tube. The float is of cork and is pierced with four vertical holes; these holes are lined with glass tubes, and through the tubes pass four stationary brass rods, which guide the float in its vertical movement and, the manufacturers state, entirely prevent sticking. The gasoline needle-valve is in the cover of the float chamber. In the bottom of the carbureter is a needle-valve, adjusted by hand, for regulating the flow of gasoline to the spray nozzle. An interesting feature of the carbureter is the automatic priming. A little hollow or cup in the mixing chamber collects a small quantity of overflowing gasoline when the motor is stopped and this acts as priming, making the well-known operation of "tickling" unnecessary. A throttle, acting on the mixture as it passes to the engine supply pipe, is incorporated with the carbureter. The "Reliable" carbureter is made in seven sizes, from 1-2 inch to 3 inches, standard pipe sizes, and when desired for use with two-cycle motors check valves can be supplied, made especially for the purpose. Brass is the material used in the standard carbureter, but aluminum can be had on special order.

HANDY WRENCH SET.—The experienced automobilist knows the handiness and convenience of a solid wrench for many little jobs about the car, and also the utility of a solid wrench with the head set on the handle at an angle, so that a nut can be worked in a close place. A wrench set has been placed on the market by the Pedersen Manufacturing Company, of New York,

with the idea of combining in a single tool wrenches of several sizes and with any angle between handle and head. To accomplish this a single handle is made to take four different sizes of heads, corresponding with the sizes of small nuts most commonly used in automobiles. Each head can be set at any angle without removing it from the nut and without any screws, springs or other adjustments; in fact, there are absolutely no parts except the heads and handles, each in a single-piece steel forging. The head can be turned through nearly half a circle, the positions being only about an eighth of an inch apart. The hold is positive in any position and there is nothing to catch or bind, or to break under the stress of actual use.

SPRINGFIELD MOTOMETER.—The speed indicating instrument illustrated herewith is manufactured by the R. H. Smith Manufacturing Company, of Springfield, Mass., under the name of the Springfield Motometer. The simplicity of the working parts is well shown. The principle of centrifugal force is utilized to actuate a pointer working over a vertical scale, graduated to read in miles and fractions of a mile. The lower part of the vertical driving shaft drives the trip and total odometer through worm gearing. The whole thing is very free from complexity and the working parts are en-



WORKING PARTS OF SPRINGFIELD MOTOMETER

closed and thoroughly protected from dust and dirt, as well as from accidental damage. The connection between the governor and the pointer is positive, and the pressure of several pounds required to compress the spring results in a very steady indicator. The movement is made entirely of steel, with hardened, self-lubricating bearings. The manufacturers state that the only bearing requiring the attention of the driver is that of the pinion spindle attached to the

hub of the wheel for driving the flexible shaft, and this is provided with a compression oil cup which will keep the bearing lubricated for 25,000 miles if directions are followed—that is, give the cup a quarter turn every 500 miles. An arrow shows which way to turn it. Fittings are furnished for any car, foreign or domestic, and speed dial and odometer dials can be furnished, reading in kilometers. A booklet illustrating and describing the device and giving some useful information on the subject is issued by the manufacturers. The instrument is practically unchanged from 1906, though a new name has been adopted.

AUTOCHIME SIGNAL.—A compact and convenient exhaust-sounded signal is manufactured by the Gray-Hawley Manufacturing Company, of Detroit, Mich., under



AUTOCHIME EXHAUST SOUNDED SIGNAL

the name of the Autochime. This consists of a sort of chime whistle adapted to be blown by the exhaust from the engine when a special foot-operated valve is opened. A feature of the Autochime is a cup-shaped bell, cast of bell metal, which not only prevents dirt, mud and oil from entering the sound openings, but also improves the tone of the whistle signals by its rapid vibrations.

POWER TIRE PUMP.—It occurred to an ingenious man that there is no sense in a chauffeur or any other human being toiling at a hand pump to inflate a big tire when there is a powerful motor right at hand which might be made to do the work. The result of the idea was the Spencer Giant air pump, manufactured by the Auto Pump Company of Springville, Erie Co., N. Y. The Giant pump consists of two small pump cylinders, connected together by a frame in the position of double opposed cylinders, with their plungers connected by a single rod. A shaft at right angles to the cylinders carries a small crank connected by a rod to the rod which extends from piston to piston. The outer end of the crankshaft carries a connection adapted to engage the forward end of the motor shaft, where the starting crank is usually applied, and at each end of the frame of the pump is a handle, so the user can get a good grip with both hands. Suitable connections with rubber piping extend to the tire valves in the usual way. To use the pump it is only necessary to connect up the rubber piping with the tire valves and the pump, start the motor and hold the pump shaft against the engine shaft, and wait until the pump has done its work. Various styles of shaft connections are made, so that the pump can be used with motors having fixed starting cranks—in fact, the manufacturers state that the various connections made permit the use of the Giant pump on any car.

CLEVER ADVERTISING.—Under the title "Familiar Quotations from the Advice of Advertisers" the Dow Portable Electric Company, of Braintree, Mass., has issued a highly amusing little folder advertising the Bullard wrench, which it handles. The clever parodies on familiar advertising phrases and pictures are well worth a laugh. Besides, the wrench itself is described and a price list given. The Bullard wrench can be used as a pipe wrench or monkey wrench and one of the claims made for it is that it will not crush the pipe when used as a pipe wrench, but will exert a tangential pressure tending to turn the pipe.

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Motor Car Equipment Co.	47, 48 and 50
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Packard Electric Co.	48
Pantasote Co.	51
Parish & Bingham Co.	52
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Pederson Mfg. Co.	49
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Penn Petroleum Co.	84
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Pneumatic Tire Protector Co.	60

Pope Motor Car Co.	99
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